

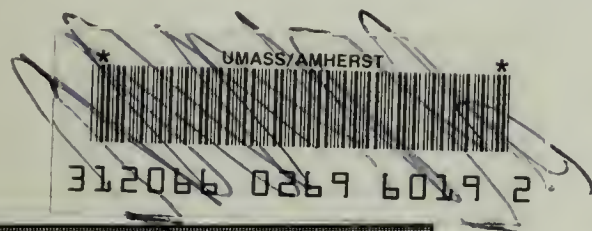
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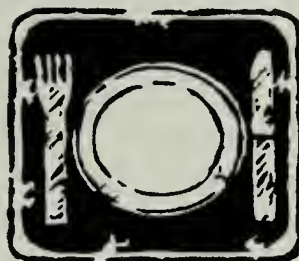
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TNC



Managing Your TNC Drinking Water System

A Guide to the Massachusetts
Requirements for
Transient Noncommunity
Public Water Systems (TNC)

June 1998

GOVERNMENT DOCUMENTS
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Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection Drinking Water Program



Managing Your TNC Drinking Water System

**A Guide to the Massachusetts
Requirements for
Transient Noncommunity
Public Water Systems (TNC)**

June 1998



Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection Drinking Water Program



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

ARGEO PAUL CELLUCCI
Governor

TRUDY COXE
Secretary

DAVID B. STRUHS
Commissioner

Attention: Transient Noncommunity Public Drinking Water Systems

Dear Owner or Operator:

June 1998

The Massachusetts Department of Environmental Protection (DEP) has identified your establishment as a Transient Noncommunity Public Water System (TNC). Your system is one of approximately 875 TNCs in the state. Some examples of TNC systems are campgrounds, motels, gas stations, rest stops, restaurants, and golf courses.

As an owner or operator, it is your responsibility to meet federal and state drinking water standards and provide high quality drinking water for your customers. *Managing Your TNC Drinking Water System, A Guide to the Massachusetts Requirements for Transient Noncommunity Public Water Supplies* will help you in complying with Massachusetts Drinking Water Regulations, 310 CMR 22.00. This guide contains information on initial and routine testing, treatment devices, sample reporting forms, and the regulations that apply to TNCs. Additionally, there is a directory of sources for assistance and public outreach.

The DEP expects you to keep this guide available for daily use and will be periodically sending you three hole-punched updates for you to insert. During DEP inspections, staff will review and update this guide with you as needed.

This Guide will be available on the internet at the DEP address: <http://www.state.ma.us/dep>. Additional hard copies may be purchased through the DEP / Drinking Water Program, 6th Floor, 1 Winter St., Boston, MA 02108 for a fee of \$8.00. Checks should be payable to the Commonwealth of Massachusetts.

We encourage you to use this guide in complying with the law and in providing high quality water to your customers. Please contact us if you see something missing from the guide or to offer suggestions for outreach materials. You may reach us at the DEP / Drinking Water Program at 617-292-5770.

Sincerely,

A handwritten signature in black ink, appearing to read "David Y. Terry".

David Y. Terry, Program Director
Drinking Water Program

cc: DEP Drinking Water Programs, Springfield, Worcester, Woburn, Lakeville

tnccov.doc

ACKNOWLEDGMENTS



This guide was prepared by Department of Environmental Protection (DEP) staff and reflects the contributions and suggestions of many people in the drinking water field.

Special recognition is given to Heidi Feusi.

Additionally, we thank Donovan Bowley, Paula Caron, Tara Gallagher, Darren Hersh, Judith Hutchinson, Elizabeth Kotowski, Yvette dePeiza, Marie Tennant, George Zoto, and the staff of the Water Quality Assurance section .



This information is available in alternate format upon request to
Bette Stewart, ADA Coordinator, BAS/HR, 4th floor, One Winter Street, Boston, MA 02108



Publication of this information is supported by the Massachusetts Safe Drinking Water Act Assessment

Managing Your TNC Drinking Water System



A Guide to the Massachusetts Requirements for Transient Noncommunity Public Water Systems

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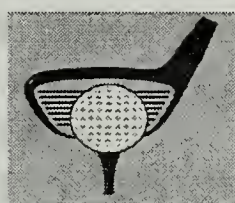
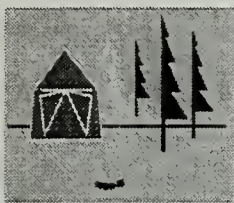
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(Any text in the manual that is in “*Quoted Italics*” can be found in the appendices.)

INTRODUCTION

The Massachusetts Department of Environmental Protection (DEP) has identified your establishment as a **TRANSIENT NONCOMMUNITY (TNC)** public water system. To confirm your system's designation as a TNC, see Appendix B.

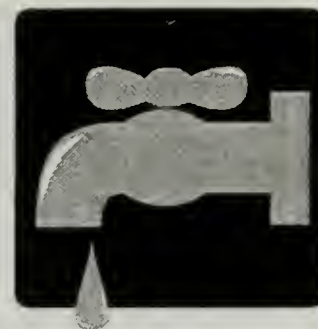
A **TRANSIENT NONCOMMUNITY** public water system (PWS) is any publicly or privately owned system that provides piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily for at least 60 days per year. This includes, but is not limited to, campgrounds, motels, gas stations, golf courses, restaurants and roadside rest stops.



Drinking water uses, defined under Federal and Massachusetts regulations, include all sanitary functions in which the public has access to drinking water. This includes, but is not limited to, bubblers, coffee makers, post mixed beverage machines and restroom facilities. Serving bottled water on the premises does not exempt your system from meeting the Massachusetts public drinking water requirements.

As an owner and/or operator of your water system, you should be familiar with the *Massachusetts Drinking Water Regulations 310 CMR 22.00* (See Appendix I) because you are responsible for seeing that your system consistently meets state and federal drinking water quality standards. Compliance with the law provides your customers with added protection against waterborne disease.

This handbook is intended to serve only as a guide and contains material determined to be of most value and interest to the owners and operators of TNC public water systems. It does not relieve you of any other public water supply responsibilities under current state policies and regulations. Complete copies of the regulations and policies can be purchased from the State House Bookstore in Boston and Springfield. See Appendix A.



GENERAL PURPOSE AND RESPONSIBILITIES

The Massachusetts Drinking Water Regulations are designed to protect the public health and general welfare by ensuring that water systems in Massachusetts provide water that is safe to drink. These regulations took effect on June 24, 1977, and were updated on March 21, 1997.

The Department of Environmental Protection (DEP) is the primary enforcement authority under the federal Safe Drinking Water Act (SDWA).

As the operator/owner of a PWS, it is your responsibility to:

- maintain and provide potable drinking water in compliance with the regulations;
- to report your water quality test results to the DEP; and
- to maintain your system under the supervision of a certified operator.

WATER QUALITY TESTING AND REPORTING

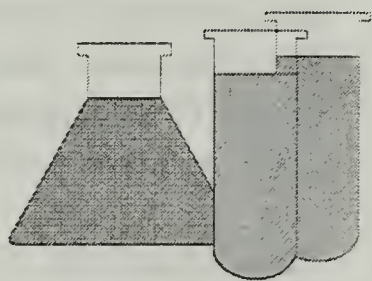
To determine if you are providing water that is safe to drink, all transient noncommunity water supplies must initially test for the contaminants listed in Appendix C. Submit these test results to DEP within 60 days of being registered as a public water supply.

Routinely test for coliform bacteria, nitrate, nitrite, and sodium according to the sampling schedule issued to your facility by DEP. Please note, the DEP may require additional testing as needed. An example of a *TNC sampling schedule* is provided in Appendix C.

For a copy of your specific sampling schedule, call your DEP Regional Office.

Use a Massachusetts-certified laboratory to test for each drinking water contaminant.

DEP will reject all reports submitted by an uncertified laboratory, and will require you to retest. A list of all Massachusetts certified laboratories may be obtained through the DEP's Wall Experiment Station at 978-682-5237 or the DEP home page at: <http://www.dep.state.ma.us>.



Submit results to DEP on the required forms.

A certified laboratory will usually report the test results on DEP forms upon request. DEP will reject all results submitted on the incorrect form.

Report the results of every required test. Do this within 30 days of receiving test results and no later than 10 days after the end of the reporting period.

Follow proper collection procedures or the sample results could be invalid. Samples can be collected by a certified operator, a certified laboratory, or someone who has been properly trained in this procedure. Please see Appendix C for Proper "*Sampling Procedures*".

COLIFORM BACTERIA

Coliform bacteria are fairly common in nature. They are found in the intestines of warm-blooded animals (including humans), and in plants, soil, air, and water. Coliform bacteria are usually not harmful, however their presence in water may indicate that the water is polluted and may contain disease-carrying organisms.

Coliform bacteria samples should be taken at a tap that is representative of the water throughout the distribution system. These sites should be listed on the system's "*Coliform Sampling Plan*" and filed at your DEP Regional Office (see Appendix D). If coliform bacteria are not found in the water sample, you passed the coliform test. Continue performing routine tests as designated by your schedule.

If coliform bacteria are found in your water sample and you have exceeded the MCL, immediately notify your DEP regional office. The DEP will assist you in determining the cause of the contamination and taking the needed steps to comply with the regulations. You should also complete and mail a copy of the "*Coliform Violation Evaluation Survey*" form to your regional DEP office. This form will help DEP to track the cause of the coliform occurrence and help to eliminate its presence. A copy of "*The Total Coliform Rule Summary*" is included for assistance. See Appendix D for these forms.

NITRATE AND NITRITE

These inorganic chemicals are used in fertilizers, are found in sewage and wastes from humans and farm animals, and generally get into drinking water from these activities. High levels of nitrate and/or nitrite in drinking water have caused serious illness and sometimes death in infants under six months of age.

Nitrate is converted to nitrite in the body. Nitrite interferes with the oxygen carrying capacity of blood. This is an acute disease in that symptoms can develop rapidly, especially in infants. This condition is called methemoglobinemia or "blue baby" syndrome. In most cases, health deteriorates over a period of days. Symptoms include shortness of breath and cyanosis (gray/blue color) of the skin. Expert medical advice should be sought immediately if these symptoms occur.

Nitrate and nitrite must be sampled at the entry point to the distribution system which is representative of each well after any treatment. The U.S. EPA's maximum contaminant level (MCL) for nitrate in drinking water is 10 mg/L, and nitrite is 1.0 mg/L. The MCL for nitrate and nitrite combined is 10 mg/L.

SODIUM

Sodium is a naturally occurring common element found in soil and water. The DEP guideline is 20 mg/L for sodium. This guideline represents a level of sodium in water that physicians and sodium sensitive individuals, such as those with high blood pressure, should be aware of in cases where sodium intake is being monitored.

Sodium must be sampled at the entry point to the distribution system which is representative of each well after any treatment.

In addition to reporting sodium results to the DEP, you must also notify your local Board of Health and the Massachusetts Department of Public Health (DPH) if your sodium result is greater than 20 mg/L. A sodium "Notification Form" is included in Appendix E for your convenience.

REPORTING REQUIREMENTS



If you fail to comply with any of the monitoring requirements for coliform, nitrate, nitrite, sodium, or any other contaminant that

DEP may require, you must contact DEP within 24 hours.

You must submit a completed annual statistical report to the DEP in January. DEP will send you a statistical report form in December of each year. See Appendix F for this form.

CERTIFIED OPERATOR REQUIREMENTS (310 CMR 22.11 B)

Is your water system operated by a state-certified drinking water operator? All public water systems in Massachusetts **must** be managed by a person with a certificate of competency from the Massachusetts Board of Certification of Drinking Water Supply Facilities. This includes very small systems (serving 500 people or fewer),

water vending machines, and bulk water operations.

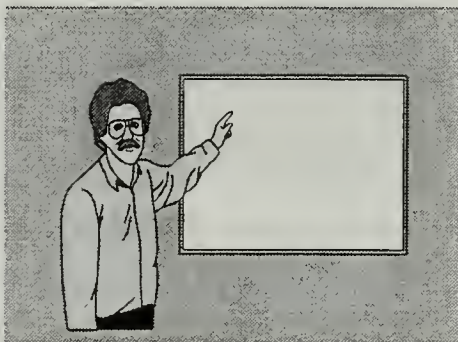
Certified operators are the most important resource for providing a safe supply of water to the public. They are trained in the workings of public water systems as well as the rapidly changing state and federal drinking water laws.

If your system is not being run by a certified operator, do one of the following:

1. You or a staff person can become certified as a Very Small System (VSS) or Water Vending Machine (VND) operator by taking an examination and meeting certain education and experience requirements; or
2. Hire a certified operator of your choice on a contract basis.

Examinations to become a certified operator are given by the National Assessment Institute (NAI) (508-624-0826) in April, July, and November. More than 80 percent of the people who take the VSS exam pass. There is a fee to take the exam.

After passing the examination, you must apply to the Board for certification. There are fees for application and renewal.



Certified operators must maintain their level of competency and knowledge of the regulations through continuing education. Operators are required to earn five training contact hours (TCHs) each renewal period. See the Appendix A for contact names and numbers.

If you choose to hire an operator, refer to the "Directory of Public Water System Certified Operators for Contract Services" which is available at the State House Bookstore (see Appendix A) or consult the enclosed "*Certified Operator Compliance Handbook*", (see Appendix G). Use the "*Certified Operator Compliance Form*" to record your hiring. Also use the "*Certified Operator Inspection Form*" to ensure that your operator is providing all of the services you need. Please keep copies of these completed and signed forms for DEP review.

In the meantime, you **must** apply for **Temporary Emergency Certification** to keep your system in compliance. This certificate will allow you to designate a person to operate your system for six months while you become certified or hire a certified operator. See Appendix G for a "*Temporary Emergency Certification Application*" form.

PUBLIC NOTIFICATION REQUIREMENTS

Anytime there is even a slight chance the water you supply could cause a health hazard for your customers, you are required to notify them as soon as possible. The Environmental Protection Agency (EPA) and the DEP require this mandatory notification whenever there is an exceedence of a MCL. For more specific language on this topic please consult The "*Massachusetts Drinking Water Regulations*" 310 CMR 22.16 in Appendix I. If you fail to notify your customers you may be subject to civil penalties.

If a public notice is warranted, it must provide a clear and readily understandable explanation of:

- the violation;
- any potential negative health effects;
- the population at risk;
- steps the system is taking to correct the violation; and
- preventative measures the consumer should take until the violation is corrected.

The notice must:

- be clear and conspicuous in design;
- contain non-technical language;
- use print that's easily read;
- contain the phone # of a knowledgeable person; and
- contain multilingual information, where appropriate.

Within 14 days of a violation you must:

- post the Public Notice for a minimum of 3 weeks (or for as long as the violation exists) in at least 2 conspicuous locations in each building that is served by the public water system; and
- mail a copy of the Public Notice to your DEP Regional Office.

The more serious the health risk, the tougher the Public Notification requirements. The timing, required wording, and delivery of public notices vary depending on the seriousness of the health risk involved.

Contact your DEP Regional Office for Public Notification forms for specific violations especially Maximum Contaminant Level (MCL) exceedances. See the Appendix H for a sample "*Public Notification Form*" for monitoring and reporting violations.

VIOLATIONS

DEP will issue you a Notice of Noncompliance (NON) when you fail to comply promptly with a



reporting requirement or a laboratory test that shows an exceedance of the maximum contaminant level (MCL). This notice explains the nature of the violation, the regulations that were

violated, corrective and public notification actions which must be taken, and the deadline for such actions.

Once you respond to DEP on all corrective actions, such as sampling for a contaminant and submitting copies of the public notice, your system will return to compliance.

All violations are kept on record and reported to the United States Environmental Protection Agency (USEPA). If you accumulate four NONs within a 12-month period, your system will be classified as a significant noncomplier (SNC). Before you become a SNC you will be required to submit a plan detailing what specific actions will be taken to prevent any further noncompliance. In addition, you may be subject to federal enforcement action if you become an SNC.

If you fail to take any action required by DEP by the prescribed deadline, or if you otherwise fail to remain in compliance, you could be subject to legal action including criminal prosecution, court-imposed civil penalties, or civil administrative penalties. A civil administrative penalty may be assessed by DEP for every day that you are out of compliance with the requirements.

WELLHEAD PROTECTION REQUIREMENTS

Zone I

The primary protection area around a public water system well is known as the Zone I. The Zone I is a 100 to 400 foot protective radius around the well which must be owned or controlled by the water supplier using conservation restrictions. The extent of the protective radius depends on the approved yield of the well.

If you do not know the radius of your Zone I, Contact DEP for assistance.

To protect your well from possible sources of contamination, only activities that are directly related to the PWS and are nonthreatening to the water quality are allowed in the Zone I. Regularly inspect your protection area to be sure the water quality is not being downgraded.



DEP will not approve any new public water supply well which cannot meet Zone I requirements, and which is located where another approved public water system can reasonably supply the customers.

Any public water supply well which has come on-line without prior DEP approval since January 1, 1994 and does not meet Zone I requirements must conduct a pumping test, sample for all applicable water quality parameters, and perform other actions as required by DEP.

Interim Wellhead Protection Area

The Interim Wellhead Protection Area (IWPA) is based upon the approved yield of the well and ranges from a 400 foot to a one half mile radius. The IWPA represents the recharge area of the well. You do not have to own or control this area around your well; however, be aware of the land use activities as they can affect the water quality of your well. If you do not know the radius of your IWPA contact DEP for assistance.

Requirements:

- Restrict access to the well.
- Inspect your protection area regularly to be sure that there are no activities that are a potential threat to water quality.
- Ensure the activities of the business or institution served by your PWS are protective of the water supply.
- Slope parking areas and concrete pads under storage areas away from the well; periodically check their condition, and repair any permeable areas.
- Locate maintenance sheds and chemical storage areas outside Zone I.
- Do not use or store pesticides or herbicides in the Zone I.
- Do not locate septic tanks or leach fields in the Zone I. Pump septic tanks every two years. Never dump hazardous substances down drains.
- Inform your staff and water users of potential threats.
- Request a copy of DEP's "*Wellhead Protection Tips for Small Public Water Systems*."
- Seek assistance from your local Board of Health in managing your wellhead protection area.

See Appendix H for the "*Source Protection Sign Order Form*."

SANITARY SURVEYS

A sanitary survey is an onsite review of the water sources, facilities, equipment, operation and maintenance of a public water system for the



purpose of evaluating the adequacy of the system to produce and distribute safe drinking water. All TNCs must conduct a sanitary survey of their system by June 30, 1999 and every 5 years thereafter. These are to

be conducted by a Massachusetts Certified Drinking Water Operator or other qualified outside contractor. DEP will conduct audits of these surveys as needed. During audits and other inspections DEP staff will review all records including complaint logs. See Appendix H for a copy of the "Complaint Log". DEP will provide you with the appropriate survey form for use by your certified operator.

Right of Entry

Employees of the Commonwealth have the authority, upon presentation of their credentials, to enter your facility for the purpose of inspecting, surveying and sampling public water systems.

CROSS CONNECTIONS

A cross connection is any actual or potential connection between a distribution pipe of potable water from a public water system and any water pipe, soil pipe, sewer, drain or other unapproved source. Cross Connections can cause severe illness and death and must be corrected.

Nonpotable water or chemicals used in equipment or a plumbing system can end up in the drinking water line as a result of back pressure or back siphonage. The outside watering tap and garden hose are common sources of cross connections. The garden hose creates a hazard when submerged in nonpotable water such as a swimming pool or when attached to a chemical sprayer for weed-killing. Businesses such as photo labs, beauty salons, and doctor and dental offices can also be sources of cross connections. Cross connections can also occur in air conditioning or cooling systems, fire protection systems, lawn irrigation systems, and high pressure boilers.

Requirements:

1. Have your facility surveyed by a cross connection surveyor to make sure you are not creating a cross connection.
2. Insure that all plumbing changes are approved by the local plumbing inspector.
3. Do not attach any pesticide, chemical, or any other nonpotable liquid applicators to your water line.
4. Install hose bib vacuum breakers on all outside faucets. The hose bib vacuum breaker isolates garden hose applications, protecting your drinking water supply from contaminants that could be drawn into your facility through the hose.
5. Color code all potable lines in dark blue and all nonpotable lines in colors listed in the *DEP Guidelines and Policies for Public Water Systems*.
6. Eliminate every cross connection. If this is not possible, install backflow preventers which are approved by DEP. You must get a DEP permit for these devices.

For further information on cross connection prevention, certified testers and surveyors, call your regional DEP office or the New England Water Works Association (NEWWA) at 978-478-6996.

NEW CONSTRUCTION OR REPLACEMENT OF A WELL

Contact your DEP Regional Office for guidance and technical assistance if you are constructing a new well or replacing a well. Plans and permits must be submitted and approved by the DEP before a well is drilled and placed on-line. You will also have to document your control or ownership of the Zone I land area. Costs of having your small well approved will include a \$700 DEP permit fee for Site Source/Conduct Pumping Test (BRP WS 13) and an \$800 DEP permit for Pump Test Report/Construction Source (BRP WS 15) plus consultant fees.

TREATMENT DEVICES AND SYSTEM IMPROVEMENTS

Occasionally a water supply may require treatment with a water softener, filter, chemical additives, or system modifications. All devices and major system modifications must have prior DEP approval. Submit plans and specifications, designed by a professional engineer, to the regional office for review and approval. DEP



will ensure that a proposed treatment is appropriate for the water supply and that your certified operator is qualified to properly maintain the treatment system. DEP permit fees for these modifications are approximately \$200 to \$300.

SALE OF WATER SUPPLY LAND

No supplier of water may sell, lease, assign, or otherwise dispose of, or change the use of, any lands used for water supply purposes without the prior written approval of DEP. The supplier must demonstrate that such action will have no significant adverse impact upon the water supplier's present and future ability to provide continuous adequate service to consumers under routine and emergency operating conditions. Emergencies include contamination of sources, distribution system failure, and shortage of supply (310 CMR 22.24).

PUBLIC WATER SUPPLY DECLASSIFICATION / RECLASSIFICATION

Your system is currently classified as a TNC public water system because it serves over 25 people a day at least 60 days of the year.

If your system serves at least 25 of the same persons (such as employees) over 4 or more

hours per day, 4 or more days per week, at least 180 days (six months) of the year, your system will be reclassified as a Non-Transient Non-Community (NTNC) public water supply. Your system will be required to comply with all additional NTNC regulations and testing requirements. Please call your DEP Regional Office to discuss reclassification guidelines.

If at any time you feel that your system does not meet your current classification criteria (you hook up to municipal water or your business changes and drops below the 25 people served per day) contact your DEP regional office to discuss your situation and request a declassification form.

If DEP determines that you do not meet the criteria for a public water system you will be declassified and no longer subject to the Massachusetts Drinking Water Regulations. Instead, the Local Board of Health will be notified and your private system will be subject to their regulations.

**DRINKING WATER
ASSESSMENT**

All public drinking water systems are required to pay an annual assessment to the DEP for protection of public water supplies. This assessment is intended to make up the difference between the Federal Safe Drinking Water Act (SDWA) requirements and the funding available through state appropriation and federal grant to implement the required SDWA program. The assessment is billed by DEP to the public water system to be collected from the end user or customer. This money is also used to provide

technical assistance and outreach to suppliers who must ensure high quality water for their customers. The assessment also helps suppliers comply with state and federal mandates under the Safe Drinking Water Act. This amount can be reduced if the system installs meters. Most TNCs are assessed at \$35.00 per year.

**ESTIMATED ANNUAL COST
OF MANAGING A TNC**

<p>Start-Up Costs/Permits: \$1500 + Consultant Fees</p> <p>Initial Water Quality Testing: \$600 - 1600</p>
<p>Routine Water Quality Testing: \$120 - \$250</p> <p>Assessment Fee: \$35</p> <p>Certified Operator Contract: \$200 - \$2000 or Self Certification Fees (Exam/Appl/License): \$78</p> <p>Routine Operation and Maintenance: \$20 - \$200</p>

Appendices

Appendix A: Technical Assistance and Outreach Directory

Appendix B: DEP Fact Sheet

“Are You a Public or Private Water System?”

Appendix C: Basic Sampling

Existing Source-Initial Water Quality Testing
Sampling Procedures
Sample Schedule
DEP Water Quality Testing Forms

Appendix D: Coliform

Guidelines for Selecting Coliform Sampling Points
The Total Coliform Rule Summary
Coliform Sampling Plan
Coliform Violation Evaluation Survey

Appendix E: Sodium

Sodium Handbook
Notification Form

Appendix F: Annual Statistic Report for 1997

Appendix G: Certified Operator Compliance Handbook

Appendix H: Forms

Public Notification Form
Complaint Log Form
Source Protection Sign Order Form

Appendix I: Drinking Water Regulations 310 CMR Section 22.00

Insert: 1996 Special TNC Issue of “In The Main”

Appendix A

Technical Assistance and Outreach Directory

TECHNICAL ASSISTANCE AND OUTREACH DIRECTORY

GOVERNMENT LISTINGS:

DEP Boston (Main Office)

617-292-5770

Drinking Water Program

One Winter Street 6th Floor
Boston, MA 02108

DEP Western Region

413-784-1100

436 Dwight St.
Springfield, MA 01103

DEP Central Region

508-792-7650

627 Main Street
Worcester, MA 01608

DEP Northeast Region

978-661-7600

205-A Lowell Street
Wilmington, MA 01887

DEP Southeast Region

508-946-2700

20 Riverside Drive
Lakeville, MA 02347

DEP Wall Experiment Station

978-682-5237

DEP Certified Operator Requirements

617-556-1191 or 617-292-5770

Contact for temporary certification, training certification, and training guidance.

DEP Drinking Water Home Page

<http://www.state.ma.us/dep/brp/dws>

The Program's Home Page includes links to a variety of other sites, including other DEP bureaus and state environmental agencies.

DEP Comment Box

E-mail the Drinking Water Program with your suggestions or comment on rules or regs by e-mail. The address is:
DWP.Comment@state.ma.us



DEP Home Page

<http://www.state.ma.us/dep>

DEP "In The Main"

617-292-5534

Newsletter published by the DEP, Drinking Water Program to inform PWS officials about new state and federal activities, regulations, training programs, and workshops.

US Environmental Protection Agency (EPA) Region 1 - Source Water Protection

617-565-3616 or 617-565-4721

Contact for New England resource protection issues, cross-state resource protection and national legislation

US EPA Home Page

<http://www.epa.gov>

Safe Drinking Water Act Hotline (EPA)

800-426-4791 (9:00 AM - 5:00 PM EST)

The Hotline's primary function is to assist the regulated community and the public with the regulations and programs developed in response to the Safe Drinking Water Act Amendments. Also contact for information on water quality, drinking water, technical publication, public education materials, and source protection planning.

NON-GOVERNMENT LISTINGS:

American Water Works Association

800-366-0107 or 800-426-4791

Small System Operational Support

A service for small water systems serving 1000 connections or less. This service extends and complements other information resources aimed at increasing small system viability and compliance. Services provided: Practical and educational information in water quality, regulations, operations, management, and safety.

Massachusetts Water Works Association (MWWA)

978-692-0199

Professional association for waterworks industry. Contact for operator training, educational materials, and newsletter.

National Drinking Water Clearing House

800-624-8301

Services provided: Free Newsletters: "On Tap" and "Water Sense"; Free Telephone Consultations; Computer Bulletin Board; Referrals; Products (educational, government publications, etc.).

Natural Resource Conservation Service (formerly Soil Conservation Service)

413-253-4350 (Central Ma)

Contact for soil conservation assistance and maps.

New England Water Works Association,

508-478-6996

Professional association for waterworks industry. Contact for training courses, cross connection prevention, public information and assistance.

Northeast Rural Water Association (NeRWA)

802-660-4988

NeRWA's primary aims are to help the small system operator provide an adequate supply of quality water to rural residents and to help the system meet the requirements of the Safe Drinking Water Act. NeRWA's free services include

certified operator training and on-site assistance with sampling, maintenance, and operations.

University of Massachusetts Extension, Natural Resources and Environmental Conservation Program

413-545-2188

Contact for watershed protection, public education materials, wastewater management, septic systems, capacity building and non-point source pollution.

Watershed Associations

617-727-1614

Contact for watershed resource issues, protection, water sampling, data collection, recreational and educational events. Contact Riverways Program for listing at number above.

Rural Community Assistance Program (RCAP)/RHI

978-297-5300 or 800-488-1969

Provides training and technical assistance to rural communities on improving their drinking water systems. These services are provided at no cost to the group or community involved.

Publications Available At:

State House Bookstore
State House, Room 116
Boston, MA 02133
617-727-2834

State House Bookstore
21 Elm Street
Springfield, MA 01103
413-784-1376

Many publications are available including the Massachusetts Drinking Water Regulations (310 CMR 22.00) and 1996 Guidelines and Policies for Public Water Systems, Vol. I and II

For a listing of available publications at the statehouse bookstore use the internet at:
<http://www.state.ma.us/sec/spr>

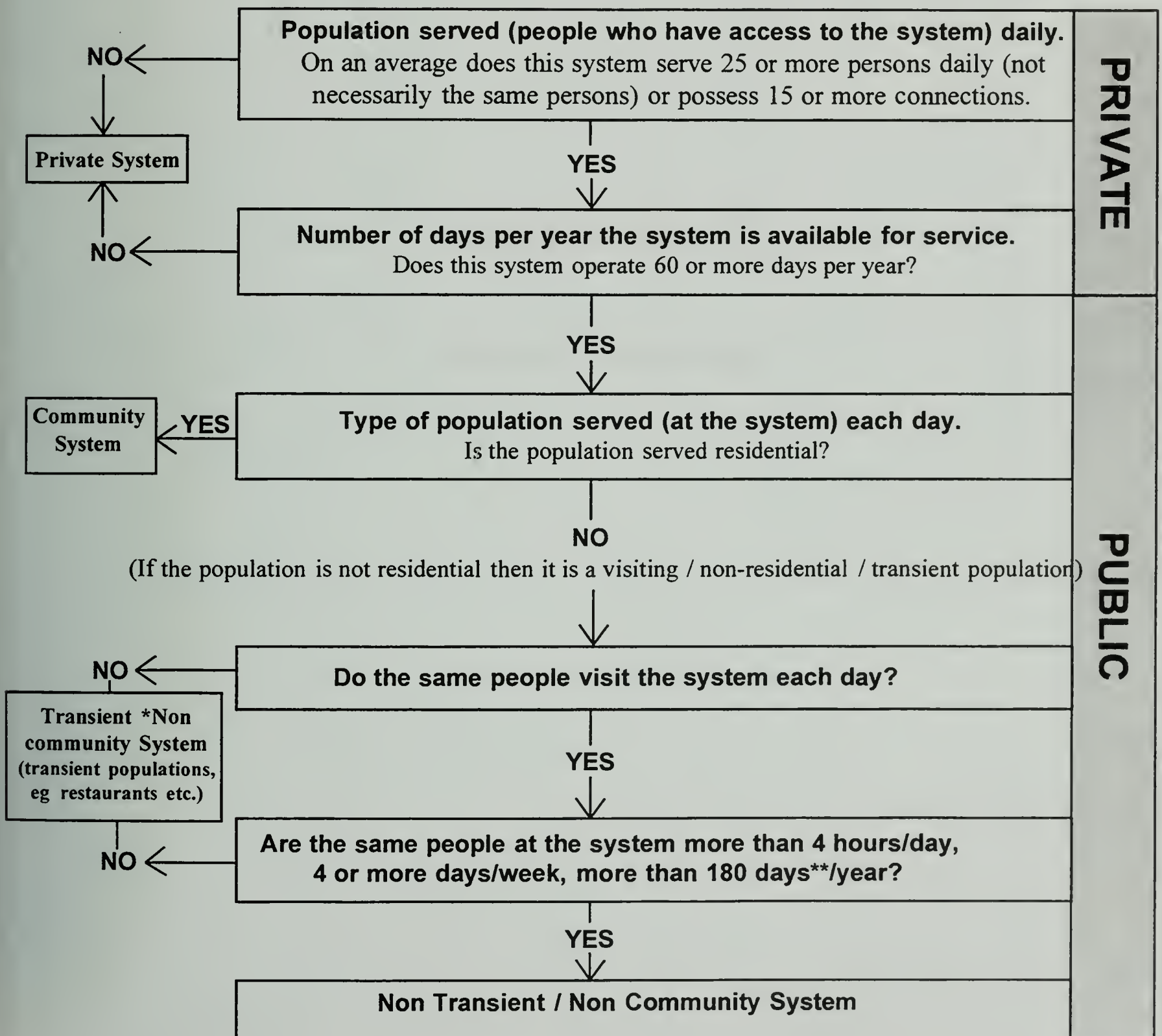
Appendix B

DEP Fact Sheet

Are you a Public or Private Drinking Water System+?

Massachusetts Department of Environmental Protection
Drinking Water Program

Follow this chart to Determine Your Drinking Water System Type



+ As defined by the Massachusetts Drinking Water Regulations 310 CMR 22.00 and the Federal Safe Drinking Water Act

* If the system (a) employs fewer than 25 people (b) does not use the piped water on its premises for human consumption and (c) bathrooms are not accessible to the general public, DWP Policy 94-02 considers the system to be private and therefore regulated by the Local Board of Health. Please contact the Drinking Water Program at 617-292-5770 for a copy of DWS Policy 94-02.

** 180 days/year of the same person service generally means workers, students, inmates, etc.

Appendix C

Basic Sampling

EXISTING SOURCE INITIAL WATER QUALITY TESTING

Transient Non-Community (TNC)

INSTRUCTIONS

Water samples must be collected and analyzed for all applicable parameters within 60 days of registration as a public water supply. Results must be submitted to the Department as required by Massachusetts Drinking Water Regulations 310 CMR 22.00 and the guidelines and policies for existing sources.

All water quality testing must be done by a Massachusetts Certified Laboratory. For a list of certified laboratories contact the Wall Experiment Station at 508-682-5237 or the web at: <http://www.state.ma.us/dep>.

The laboratory must be certified in all applicable potable water categories. The laboratory must also use approved methods and be able to achieve all required method detection limits (MDLs). Please note that Massachusetts certified laboratories will put test results on DEP forms upon request.

All data is to be reported on Massachusetts Department of Environmental Protection (DEP) forms and submitted to the regional office for review.

Test for all contaminants listed in the following categories found in the next section.

- (B) Bacteriological Report**
- (N) Nitrate Report**
- (NI) Nitrite Report**
- (IOC) Inorganics Report**
- (VOC) Volatile Organic Compound Report**
- (SEC) Secondary Contaminant Report**
- (R) Radionuclide Report (Gross Alpha & Radon)**

You must also test for Synthetic Organic Compounds if box is marked below:

☐ **(SOC) Synthetic Organic Compound Report**

Please send two copies of these initial water quality parameters to the appropriate regional office listed below:

- (1) DEP Western Region
Drinking Water Program
P.O. Box 2410
Springfield, MA 01101-2410**
- (2) DEP Central Region
Drinking Water Program
627 Main Street
Worcester, MA 01605**
- (3) DEP Northeast Region
Drinking Water Program
205 A Lowell Street
Wilmington, MA 01887**
- (4) DEP Southeast Region
Drinking Water Program
20 Riverside Drive
Lakeville, MA 02347**

Existing Source - Initial Water Quality Sampling Parameters

1/01/96

Report on (B) DEP Form:

Total Coliform

Fecal Coliform / E. coli

Report on (N) DEP Form:

Nitrate

Report on (NI) DEP Form:

Nitrite

Report on (IOC) DEP Form:

Arsenic	Lead
Antimony	Mercury
Barium	Nickel
Beryllium	Selenium
Cadmium	Sodium
Chromium	Sulfate
Cyanide	Thallium
Fluoride	

Report on (R) DEP Form:

Gross Alpha ₁	Gross Beta
Radon	

1. If the Gross Alpha result is equal to or greater than 5 pCi/L then Radium 226 and Radium 228 must be tested. If the Gross Alpha result is equal to or greater than 15 pCi/L then Radium 226, Radium 228, and Uranium must be tested.

Report on (SEC) DEP Form:

Alkalinity	Manganese
Aluminum	Odor
Calcium	pH
Chloride	Potassium
Color	Silver
Copper	Sulfate
Hardness	TDS
Iron	Turbidity
Magnesium	Zinc

Report on (SOC) DEP Form:

Carbofuran
 Oxamyl (Vydate)
 2,4-D
 2,4,5-TP (Silvex)
 Dalapon
 Dinoseb
 Picloram
 Alachlor
 Atrazine
 Chlordane
 Endrin
 Heptachlor
 Heptachlor epoxide
 Lindane
 Methoxychlor
 PCB Arochlor 1016
 PCB Arochlor 1221
 PCB Arochlor 1232
 PCB Arochlor 1242
 PCB Arochlor 1248
 PCB Arochlor 1254
 PCB Arochlor 1260
 Pentachlorophenol
 Toxaphene
 Benzo(a) pyrene
 Di(2-ethylhexyl)adipate
 Di(2-ethylhexyl)phthalate
 Hexachlorobenzene
 Hexachlorocyclopentadiene
 Simazine
 Dibromochloropropane (DBCP)
 Ethylene Dibromide (EDB)
 Aldicarb
 Aldicarb sulfoxide
 Aldicarb sulfone
 Carbaryl
 3-Hydroxycarbofuran
 Methomyl
 Dicamba
 Aldrin
 Butachlor
 Dieldrin
 Metolachlor
 Metribuzin
 Propachlor

Report on (VOC) DEP Form:

Benzene	1,2,4-Trichlorobenzene	p-Chlorotoluene
Carbon Tetrachloride	1,1,2-Trichloroethane	Bromobenzene
1,1-Dichloroethylene	Chloroform	1,3-Dichloropropene
1,2-Dichloroethane	Bromodichloromethane	1,2,4-Trimethylbenzene
para-Dichlorobenzene	Chlorodibromoethane	1,2,3-Trichlorobenzene
Trichloroethylene	Bromoform	n-Propylbenzene
1,1,1-Trichloroethane	m-Dichlorobenzene	n-Butylbenzene
Vinyl Chloride	Dibromomethane	Naphthalene
Monochlorobenzene	1,1-Dichloropropane	Hexachlorobutadiene
o-Dichlorobenzene	1,1-Dichloroethane	1,3,5-Trimethylbenzene
trans-1,2-Dichloroethylene	1,1,2,2-Tetrachloroethane	p-Isopropylbenzene
cis-1,2-Dichloroethylene	1,3-Dichloropropane	Isopropylbenzene
1,2-Dichloropropane	Chloromethane	Tert-butylbenzene
Ethylbenzene	Bromomethane	Sec-butylbenzene
Styrene	1,2,3-Trichloropropane	Fluorotrichloromethane
Tetrachloroethylene	1,1,1,2-Tetrachloroethane	Dichlorodifluoromethane
Toluene	Chloroethane	Bromochloromethane
Xylenes	2,2-Dichloropropane	
Dichloromethane	o-Chlorotoluene	

SAMPLING PROCEDURES

COLIFORM BACTERIA NITRATE / NITRITE / SODIUM

This is a brief synopsis of sampling procedures for some common analyses and is not intended to be all inclusive. Further information can be obtained from the latest edition of Standard Methods for the Examination of Water and Wastewater published jointly by the American Public Health Association, the American Water Works Association and the Water Environment Federation.

Coliform Bacteria:

Samples for microbiological examination should be collected in bottles which have been thoroughly cleansed and rinsed, given a final rinse with distilled water and sterilized. For samples expected to have any residual chlorine, the sample bottles should be treated with a dechlorinating agent such as sodium thiosulfate. Usually, the laboratory will provide the sample collector with the properly prepared container.

The water sample should be taken at a tap which is fed from the well. Remove all contamination devices, such as screens, aeration devices, hoses, point-of-use devices, or swiveled faucets. Outside locations are discouraged. The line should be flushed for approximately 2 to 5 minutes prior to sampling. In addition, flaming the tap or a chlorine spray may be used. In all cases, proper aseptic techniques should be observed in order to avoid sample contamination. These include:

- *Keeping sterilized sample bottles closed until just before the sample is to be collected.*
- *Do not touch the lip of the bottle or any other surface which will come into contact with the sample.*
- *Wear rubber gloves, if possible.*
- *Do not contaminate the surface of the cap or inner neck of the bottle.*
- *Fill the container to the proper level without rinsing.*
- *Immediately replace the cap.*

After the tap has been flushed, reduce water flow to permit filling the bottle without splashing. When the sample is collected (approximately 250 mL), make sure to leave an air space of at least an inch to permit mixing by shaking prior to examination.

Samples must be analyzed within 24 hours of collection and must be kept in an iced cooler if they cannot be analyzed within 1 hour of collection. Do not allow samples to become submerged in ice or melted ice water. Upon receipt at the laboratory, the samples should be refrigerated immediately.

Nitrate / Nitrite / Sodium:

Collect samples at each entry point to the distribution system and after all treatment processes. Samples must be representative of each water source **AFTER** any treatment, such as water softeners or carbon filters. These contaminants can be sampled in either plastic or glass containers. Minimum sample size for each contaminant is 100 mL. A Massachusetts certified laboratory should provide you with the proper sampling containers and preservatives.

Open the faucet and thoroughly flush the line for at least two to five minutes. Open the container without rinsing or contaminating the inner surface. Fill the container to the proper level. Tightly seal the container for transport. Mail or deliver the samples to the laboratory as soon as possible after collection. The maximum elapsed time between collection of these contaminants and analysis may vary from 48 hours to as much as six months, depending on the contaminant and preservative used. If delivery must be delayed, samples should be refrigerated at 38 F (4 C). Do not allow samples to become submerged in ice or melted ice water.

It is essential that proper procedures are followed. Keep in mind that failure to submit samples at the proper time constitutes a violation of monitoring requirements. Public notification is required when monitoring violations occur.

REQUIRED WATER QUALITY SAMPLING SCHEDULE FREQUENCY FOR 1996 TO 1998

PWS NAME: XYZ RESTAURANT

CLASS: NC

PWSID: 1123123

Lead and Copper: per

2 per QUARTER

Winter:

2 per QUARTER

Summer:

Bacteria Sampling

LOC ID#	SAMPLE LOCATION	MULT/ SING	R/F	D/S	WAIVER A/Y/N	1996				1997				1998			
						QTR1	QTR2	QTR3	QTR4	QTR1	QTR2	QTR3	QTR4	QTR1	QTR2	QTR3	QTR4

NITRATE

10000 WELL #1 NORTH
1123123-01G WELL #1 NORTH20000 WELL #2 SOUTH
1123123-02G WELL #2 SOUTH

NITRITE

10000 WELL #1 NORTH
1123123-01G WELL #1 NORTH20000 WELL #2 SOUTH
1123123-02G WELL #2 SOUTH

SODIUM

10000 WELL #1 NORTH
1123123-01G WELL #1 NORTH20000 WELL #2 SOUTH
1123123-02G WELL #2 SOUTH

R/F = RAW OR FINISHED WATER; D/S = DISTRIBUTION OR SOURCE SAMPLE Waiver: (A)pplied, (Y)es, or (N)o

NITRATE REPORT
(FORM #1B.2)**I. PWS INFORMATION:**

1. PWS ID#: _____ 2. City/Town: _____
3. PWS Name: _____ 4. PWS Class (circle one): COM, NTNC, NC
5. DEP Source Code/Location ID 6. Sample Location 7. Date Collected 8. Collected by
- A: _____
- B: _____
- C: _____
- D: _____
9. Is the Source Treated? _____ 10. Is the Sample Chlorinated? _____
11. Was the Sample Collected after Treatment? _____
12. Manifolded [] If applicable, list the connected sources: _____

13. Routine [] Special [] (explain below) _____

Notes: _____

II. LABORATORY ANALYTICAL INFORMATION:

Lab Name: _____ Lab Cert.#: _____

Subcontracted? (Y,N) _____

Sub. Lab Name: _____ Sub. Lab Cert.#: _____

Composited [] If applicable, list the composited sources: _____

Notes: _____

	Sample A	Sample B	Sample C	Sample D
Result (mg/L)				
MCL (mg/L)	10.0	10.0	10.0	10.0
Detection Limit (mg/L)				
Analytical Method				
Date Analyzed*				
Lab Sample ID#				

* Holding time for chlorinated samples is 48 hours. Holding time for non-chlorinated samples is 14 days.

Laboratory Director Signature and Date _____

Attention: Mail TWO copies of this report to your **DEP Regional Office** within 30 days of receipt of results and no later than 10 days after the end of the reporting period.

FOR DEP/DWP USE ONLY: PLEASE INITIAL AND DATE AS COMPLETED

Accepted:	Disapproved:	Data entered into WQTS:
Comments:		

NITRITE REPORT
(FORM #1C.2)**I. PWS INFORMATION:**

1. PWS ID#: _____ 2. City/Town: _____
3. PWS Name: _____ 4. PWS Class (circle one): COM, NTNC, NC
5. DEP Source Code/Location ID 6. Sample Location 7. Date Collected 8. Collected by
A: _____
B: _____
C: _____
D: _____
9. Is the Source Treated? _____ 10. Was the Sample Collected after Treatment? _____
11. Manifolded [] If applicable, list the connected sources: _____
12. Routine [] Special [] (explain below) _____
Notes: _____

II. LABORATORY ANALYTICAL INFORMATION:

Lab Name: _____ Lab Cert. #: _____
Subcontracted? (Y,N) _____
Sub. Lab Name: _____ Sub. Lab Cert. #: _____
Composited [] If applicable, list the composited sources: _____
Notes: _____

	Sample A	Sample B	Sample C	Sample D
Result (mg/L)				
MCL (mg/L)	1.0	1.0	1.0	1.0
Detection Limit (mg/L)				
Analytical Method				
Date Analyzed				
Lab Sample ID#				

Laboratory Director Signature and Date _____

Attention: Mail TWO copies of this report to your **DEP Regional Office** within 30 days of receipt of results and no later than 10 days after the end of the reporting period.

FOR DEP/DWP USE ONLY: PLEASE INITIAL AND DATE AS COMPLETED

Accepted:	Disapproved:	Data entered into WQTS:
Comments:		

MASSACHUSETTS DEP/DRINKING WATER PROGRAM

S

This form is for use by *Transient Non-Community Systems* onlyINORGANICS-SODIUM REPORT
(FORM #1S.2)

I PWS INFORMATION:

1. PWS ID#: _____ 2. City/Town: _____
3. PWS Name: _____ 4. PWS Class (circle one): COM, NTNC, NC
5. DEP Source Code/Location ID 6. Sample Location 7. Date Collected 8. Collected by
9. Is the Source Treated? _____ 10. Was the Sample Collected after Treatment? _____
11. Manifolded: [] If applicable, list the connected sources: _____
12. Routine [] Special [] (explain below)
Notes: _____

II LABORATORY ANALYTICAL INFORMATION:

Lab Name: _____ Lab Cert.#: _____
Subcontracted? (Y,N) _____ Lab Sample ID#: _____
Sub. Lab Name: _____ Sub. Lab Cert. #: _____
Notes: _____

Compound	Result mg/L	MCL mg/L	Detection Limit mg/L	Analytical Method	Date Analyzed
Sodium		none			

Laboratory Director's Signature and Date _____

Attention:

Sodium reporting: Mail TWO copies of this report to your **DEP Regional Office** within 30 days of receipt of results and no later than 10 days after the end of the reporting period.

Sodium notification: The supplier of water shall report the level of sodium for each source to its local Board of Health and Massachusetts Department of Public Health by written notice by direct mail within 30 days after the supplier of water first learns of the analytic results which indicate a detection of sodium. Notification of sodium detects should go to the following address at the Massachusetts Department of Public Health: Bureau of Environmental Health Assessment; 250 Washington Street; Boston, MA 02108-4619; ATTENTION: Sodium Notification.

FOR DEP/DWP USE ONLY: PLEASE INITIAL & DATE AS COMPLETED

Accepted:	Disapproved:	Data Entered into WQTS:
Comments:		

(p:\csocher\rep-frms.97\sod1s.2, 10/15/96)

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
RESEARCH REPORT
No. 1000

By
J. H. COOPER
and
R. M. COOPER
Submitted by
J. H. COOPER
Date
1955

Abstract
The reaction of
with
has been studied
at various temperatures
and pressures. The
products are
and
in the ratio of
to
at
atmospheres and
degrees Celsius.

Introduction
The reaction of
with
has been studied
at various temperatures
and pressures. The
products are
and
in the ratio of
to
at
atmospheres and
degrees Celsius.

References
1. J. H. Cooper, R. M. Cooper, J. Am. Chem. Soc., 77, 1234 (1955).
2. J. H. Cooper, R. M. Cooper, J. Am. Chem. Soc., 77, 1235 (1955).

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<u>PWSID#</u>	<u>PUBLIC WATER SYSTEM NAME</u>	<u>TOWN/CITY</u>	<u>LABORATORY NAME & ID#</u>

[illegible][illegible]

* LAB ID# ASSIGNED BY STATE CERTIFICATION PROGRAM
 ** CAN BE EXPRESSED AS #/100ML, PRESENT(P), ABSENT(A), OR TOO NUMEROUS TO COUNT (TNTC)
 *** COLISURE METHOD - THIS CAN DO TOTAL COLIFORM AND E.COLI SIMULTANEOUSLY, HOWEVER THE SAMPLE MUST BE INCUBATED 28 TO 48 HOURS.
 **** COPY 1: COPY TO DEP REGIONAL OFFICE; COPY 2: OWNER COPY; COPY 3: LAB COPY

Appendix D

Coliform

GUIDELINES FOR SELECTING COLIFORM SAMPLING POINTS FOR SMALL SYSTEMS

The following are general guidelines for selecting coliform sample locations. Coliform sample locations should be representative of conditions throughout the distribution system. Each system should identify enough sample locations for compliance with the sample requirements of 310 CMR 22.05 Table 1.

A public water system must collect samples at regular time intervals throughout the month or quarter. All sample locations must be submitted to and approved by the DEP. They will be reviewed and updated by DEP as required. Please note that once your sampling

plan is approved all changes must be requested from and approved in writing by your regional DEP office.

When selecting locations for collecting coliforms samples, water suppliers must also identify those locations where they would take repeat samples if the original sample location tested positive for coliform bacteria. Repeat sampling must include samples upstream and downstream of the total coliform positive routine sample site.

You must submit a map or sketch of your water supply distribution system showing the locations of all bacteria sampling sites, the well and the storage tank.

Sample location definitions:

001, 002 etc. The normal Routine Sampling (RS) location where a coliform bacteria sample is to be taken every month or quarter. This sample tap is typically in the middle of the system and is frequently used. Example: 1st floor-kitchen tap.

1a, 2a, etc. An Upstream Repeat (UR) sample site location where a coliform bacteria sample is to be taken if the normal routine sample (001) tests positive for total coliform bacteria. This sample tap is up line from the RS sample site and is usually at or near the storage tank. Example: basement-janitor's sink.

1B, 2B, etc. A Downstream Repeat (DR) sample site location where a coliform bacteria sample is to be taken if the normal routine sample (001) tests positive for total coliform bacteria. This sample tap is down line from the RS sample site and is usually near the end of the distribution line. Example: 2nd floor Men's room - left sink.

If you cannot identify an upstream and/or downstream repeat sample location because you have only one service connection you may use the original sample tap and collect 2 - 200 ml samples on each of two consecutive days.

If a routine sample (RS) is total coliform-positive, you must collect a set of **4 repeat** samples; an RS/UR/DR within 24 hours of being notified of the positive result and an additional RS at a later date in the month. Meanwhile, the laboratory will further analyze your coliform-positive sample to see if fecal or E. coli bacteria are present.

You must continue to take repeat samples every 24 hours at the same sites where the initial repeat samples

were taken until one complete set of repeat samples is free of coliform.

You **must** contact your regional DEP office within 48 hours of a positive total coliform sample. The DEP will then provide technical assistance as to the appropriate steps to take to comply with the regulations, such as how many samples to take, where to take the samples, how to determine the cause of the contamination and if public notice is necessary.

THE TOTAL COLIFORM RULE SUMMARY

As an operator and/or owner of your water supply, you need to be familiar with the Total Coliform Rule since you're responsible for seeing that your system consistently meets state and federal water quality standards. Compliance with the law provides your customers with added protection against waterborne disease.

ABOUT COLIFORM BACTERIA

Coliform bacteria are fairly common. They're found in the intestines of warm blooded animals (including humans), in plants, soil, air, and water. Coliform bacteria are not generally harmful themselves, but when found in water they indicate the water is polluted and may contain disease carrying organisms.

Fecal coliform and *E. coli* are two of the many different types of coliform bacteria. Their presence in water is serious because of their association with sewage or animal waste which may contain disease causing organisms.

SUMMARY OF THE RULE

Under the Total Coliform Rule, and according to your most recent water quality testing schedule, your system is required to collect either monthly or quarterly water samples. The samples must be analyzed by a state certified laboratory to determine the presence or absence of coliform bacteria in your water.

If no coliform bacteria are found in the water sample, it has passed the coliform test. Continue performing routine coliform bacteria tests according to your sampling schedule.

If coliform bacteria are found in your water sample, you are required to take additional samples. If repeat samples are also positive, your water may be contaminated. At this time you are required to notify your DEP regional office and your customers. In addition, you should take immediate action to determine and eliminate the cause of contamination.

KEY PROVISIONS OF THE TOTAL COLIFORM RULE

Written Sampling Plan: The Total Coliform Rule requires a written Sampling Plan and map showing that routine water samples will be collected at sites which are representative of the water throughout your system. The plan is subject to review and approval by the DEP-Drinking Water Program. If you have not submitted your plan, please complete the enclosed form Coliform Sampling Plan and return to your DEP regional office.

REPEAT SAMPLING

Repeat Sampling: If a routine sample is total coliform-positive (coliform bacteria are present in the water sample), you must collect a set of repeat samples within 24 hours of being notified of the positive result. Meanwhile, the laboratory will further analyze your coliform-positive routine sample to see if fecal or *E. coli* bacteria are present.

If Repeat Samples are Coliform Positive: If any repeat samples are coliform-positive, your system is in violation of the Total Coliform Rule. You must notify your DEP regional office and your customers. Meanwhile, to protect your customers, you need to:

1. Determine the cause of contamination and correct the problem immediately. Fill out and return to your DEP Regional Office a copy of the "*Coliform Violation Evaluation Survey*" form. See Appendix D.
2. Contact your DEP regional office for advice on what additional samples you need to take.

Sampling in the Month Following Detection of Coliform in a Sample: If you are required to collect less than five routine samples per month or quarter, you must take five (5) samples the following month, unless the requirement is waived by your DEP regional office.

Public Notification: Any time you violate the Total Coliform Rule, you are required to notify your customers so they can take necessary precautions to protect themselves against possible waterborne disease. If only total coliforms are found, you are required to provide notice by hand delivery or posting of notice within 14 days. If fecal or E. Coli bacteria are identified, the notice must be given within 72 hours of being notified of the results by the laboratory.

The Total Coliform Rule is complicated. If you have any questions, please contact your DEP regional office for assistance.

COLIFORM SAMPLING PLAN

Massachusetts DEP Drinking Water Program

Please fill in the highlighted areas and return for approval to your DEP Regional Office

PWS ID _____ PWS Name _____ PWS Town _____

Population Winter _____ Population Summer _____ Explain: _____

No. of samples required by 310 CMR 22.05B Table 1: _____ per _____

No. of backup sample sites identified _____ (mark with an asterisk) in case the routine sampling location is not accessible.

<u>Sample TYPE</u>	<u>DEP CODE #</u>	<u>Approved Sample Site Sampling Point Name or Address</u>	<u>Sampling Frequency</u>
RS	001	_____	_____
UR	1a	_____	_____
DR	1b	_____	_____
RS	002	_____	_____
UR	2a	_____	_____
DR	2b	_____	_____
RS	003	_____	_____
UR	3a	_____	_____
DR	3b	_____	_____
RS	004	_____	_____
UR	4a	_____	_____
DR	4b	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

RS-Routine Sample site (tap representative of the water system)

UR-Upstream Repeat sample site (tap upline of the RS sample tap)

DR-Downstream Repeat sample site (tap downline of the RS sample tap)

Also attach a map or sketch of your water supply distribution system showing the locations of the bacteria sampling sites, the well, and the storage tank.

Public Water Supplier Signature: _____

For DEP use

Action: _____ Date: _____

DEP Name: _____ Signature: _____

Coliform Violation Evaluation Survey

TOWN : _____
PWS NAME: _____
PWSID #: _____
PHONE #: () FAX #: ()
E-MAIL ADDRESS: _____
DATE PWS became aware of violation: _____
DATE DEP was notified: _____

Use this form to evaluate the cause of a coliform bacteria violation and to provide DEP with information on the cause of each coliform bacteria exceedence. **This form must be completed by your certified operator and sent to the Drinking Water Program at your DEP Regional Office.**

This form will not be used for compliance or enforcement.

Please call your DEP Regional Office within 48 hours of the coliform finding.

1. Month and year of coliform violation? _____ Acute MCL violation? ☐ Yes ☐ No
Number of samples taken per month? _____
2. Number of positive samples? _____ Date of repeats? _____
Number of repeats positive? _____ Number of repeats collected? _____
Which locations were positive? _____
3. Did the repeat test detect:
fecal coliform? ☐ Yes ☐ No e.coli? ☐ Yes ☐ No total coliform? ☐ Yes ☐ No
4. Was total coliform speciated? ☐ Yes ☐ No If yes, what was found? _____

5. Did you evaluate the following?
a.) Valve operations in the area of bacteria presence? ☐ Yes ☐ No
b.) Was a cross connection survey done? ☐ Yes ☐ No
If yes, what was found? _____

c.) Any flushing in the area? ☐ Yes ☐ No
6. Have you determined the cause of the coliform violation? ☐ Yes ☐ No
If yes, please check all that apply:

<input type="checkbox"/> Water entering the distribution system	<input type="checkbox"/> Cross connections (see 5b.)
<input type="checkbox"/> Raw water	<input type="checkbox"/> Sample collection error
<input type="checkbox"/> Storage tank	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Water main break	_____
7. What is your plan to prevent similar problems in the future? _____

8. If chlorinating, what is the residual in the system? _____

Signature _____ Date _____

Appendix E

Sodium



SODIUM

In Public Drinking Water
(Notification Form)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Drinking Water Program

617-292-5770

Updated: February 1998



Massachusetts Department of Environmental Protection Bureau of Resource Protection - Drinking Water Program

December 1997

Sodium Guideline Changes

The Department of Environmental Protection (DEP), Drinking Water Program (DWP), has updated its sodium guideline. The Sodium guideline is 20 mg/L. This change brings it in line with the limit applied to bottled water by the United States Food and Drug Administration (USFDA) for low sodium water.

Sodium Monitoring/Sampling

Public Water Systems(PWS) must sample for sodium at the entry point to the distribution system or a sampling point representative of each source in accordance with Massachusetts Drinking Water Regulations 310 CMR 22.06A(1) and (2) and the latest PWS sampling schedule which was provided by DEP. See attached 310 CMR 22.06A(3), Sampling Protocol, for the specific sampling requirement. PWSs and their contracted certified analytical laboratories are not allowed to composite samples to be analyzed for sodium.

Sodium Reporting and Notification

PWSs must report all results "within the first ten days of the month following the month in which the sample results were received or within the first ten days following the end of the required monitoring period, whichever comes first." Two copies of the report must be submitted on the appropriate DEP required form and sent to your DEP Regional Office.

PWSs must also send copies of all results that show a detection of sodium to their Local Board of Health and The Massachusetts Department of Public Health (DPH) by direct mail within 30 days after the PWS first learns of the analytical result which indicates a level of sodium. (Note: if sodium is not detected, there is no need to notify the Local Board of Health or DPH.) See the attached 310 CMR 22.06A(5) Sodium Notification for the specific requirement.

The DPH can be contacted as follows:

Massachusetts Department of Public Health
Bureau of Environmental Health Assessment
250 Washington Street
Boston, MA 02108-4619
Attention: Sodium Notification

Please use the attached coversheet to forward your results to the Local Board of Health and DPH.

PWSs who do not collect and analyze samples for sodium

will be in violation of the Drinking Water Regulations and will be requested to notify their Local Board of Health of their non-compliance.

The DEP/DWP recommends that, in continuing this program, each PWS should contact its Local Board of Health or Health agent to ensure that they understand the program and have copies of the DEP/DWP Public Information Notice on Sodium for distribution to consumers upon request.

Waivers from Sodium Monitoring

PWSs can qualify for waivers from monitoring for inorganic contaminants (including sodium) under the Phase II SOC/IOC rule. Eligible PWSs are encouraged to apply for a waiver if they have not already done so. If you have not received a waiver application form, please call the DEP at 617-292-5770.

Enforcement

PWSs exceeding the sodium guideline will not be required to treat or initiate additional monitoring (unless specifically requested to do so by the DEP). The DEP/DWP expects PWSs who exceed the guideline to evaluate their system operations to determine the cause and possible remediation measures. In addition, the PWS is required to respond to its consumers by providing appropriate information, e.g., the attached Public Information Notice and/or referring the customer to his/her Local Health Officer or health professional for further discussion on health effects. (PWSs that currently use posting as a form of notification may post the attached notice for general information.) In addition, PWSs may refer customers to the DPH, Bureau of Environmental Health Assessment, which will provide information on the health effects of elevated levels of sodium in drinking water upon request. As part of its Physicians Education Program, the Bureau also provides this information to physicians.

PWSs who do not collect and analyze samples will be in violation of the Drinking Water Regulations and will be required to notify their Local Boards of Health of their noncompliance.

The DEP will continue to monitor the sodium levels of all PWSs and may require additional specific actions as necessary. Please contact the DEP, Drinking Water Program at (617) 292-5770 if you have any questions on this issue.

310 CMR Section 22.06A , Sodium Regulations:**Special Monitoring for Sodium Reporting and Analytical Methods and Frequency**

- (1) **Monitoring:** All public water systems (community and non-transient, non-community and non-community;) shall monitor for the determination of sodium concentration levels.
- (2) **Initial Sampling Frequency:** Each community and non-transient, non-community and transient community water system is required to monitor for sodium during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.
- (a) **GW Sampling Frequency:** Groundwater systems shall take one sample at each sampling point during each compliance period beginning in the compliance period starting January 1, 1993. (once every three years)
- (b) **SW Sampling Frequency:** Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point beginning January 1, 1993.
- (3) **Sampling Protocol:** Monitoring shall be conducted as follows:
- (a) **Ground Water Sampling Points:** Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point) beginning in the compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
- (b) **Surface Water Sampling Points:** Surface water systems [Note: For purposes of 310 CMR 22.06A(3)(b), surface water systems include systems with a combination of surface and ground sources.] shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in the compliance period beginning January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
- (c) **Multiple Sources:** If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).
- (4) **Sodium Reporting:** The supplier of water shall report to the Department the results of the analyses for sodium within the first ten days of the month following the month in which the sample results were received or within the first ten days following the end of the required monitoring period, whichever comes first.
- (5) **Sodium Notification:** The supplier of water shall report the level of sodium for each source to the local Boards of Health and Massachusetts Department of Public Health by written notice by direct mail within 30 days after the supplier of water first learns of the analytic results which indicate a level of sodium.
- (6) **Sampling Schedules:** Each public water system shall monitor at the time designated by the Department during each compliance period.
- (7) **Sodium Analysis Analytical Methods:** Analysis for sodium shall be conducted using the following method:

SODIUM ANALYTICAL METHODS**Reference (Method Number)**

<u>Contaminant</u>	<u>Methodology⁴</u>	<u>EPA¹</u>	<u>ASTM²</u>	<u>SM³</u>	<u>Other</u>
Sodium	Atomic Absorption				
	Direct Aspiration	273.1	--	--	--
	Atomic Absorption,				
	Graphite Furnace	273.2	--	--	--
	Flame photometric				
	Method	--	--	320-A	--
	Other	--	D1428-64(a)	--	--

1 - Methods of Chemical Analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, OH 45268 (EPA-600/4-79-020), March 1983. Available from ORD Publications, CERL, EPA, Cincinnati, OH 45268.

2 - Annual Book of ASTM Standards, Vol. 11.01 American Society for testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

3 - "Standard Methods for the Examination of Water and Wastewater," 16th edition, American Public Health Association, American Water Works Association Water Pollution Control Federation, 1985.

4 - For approved analytical procedures for metals, the technique applicable to total metals must be used.

THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
AND THE DEPARTMENT OF PUBLIC HEALTH PUBLIC INFORMATION

NOTICE ON SODIUM

(For distribution to consumers upon request)

The principal source of exposure to sodium is from the diet. The average American diet can contain anywhere from 2,000 mg/d to 24,000 mg/d depending on the amount of table salt added to food. Fruits, vegetables, and meats naturally contain sodium. Many foods such as dairy products and processed food products contain higher concentrations of sodium. For example, 2 slices of white bread could contain close to 300 mg of sodium, 1 frankfurter 400- 800 mg, and diet cola 20 mg of sodium. Sodium is often added during food preparation and at the table to food. Drinking water contributes only a small fraction (less than 10%) to the overall sodium intake.

Sodium is a naturally occurring common element found in soil and water. It is necessary for the normal functioning of human systems. Sodium is part of a complex physiological mechanism involved in regulating fluids in human systems. The normally functioning kidney compensates for moderate changes in sodium intake by increasing or decreasing sodium and fluid excretion in the urine. Small changes in the sodium intake do not adversely affect plasma sodium concentrations in the majority of the population. The natural mechanisms of fluid regulation maintain a relatively constant concentration of plasma sodium. Adequate daily total sodium intakes have been estimated to range from 115 to 750 milligrams per day (mg/d) for infants, 325 to 2700 mg/d for children and 1100 to 3300 mg/d for adults.

Some people, however, have difficulty regulating fluid volume as a result of several diseases, including congestive heart failure, kidney failure and hypertension. Some individuals are genetically susceptible to hypertension, a condition which may be enhanced by elevated plasma sodium levels. Monitoring sodium intake in these individuals is important in the management of their particular malady.

The Department of Environmental Protection (DEP) is requiring all water suppliers to notify the local Boards of Health, the Massachusetts Department of Public Health, and the Massachusetts Department of Environmental Protection of the detected concentrations of sodium in drinking water. Notification is required so that individuals who are on sodium restricted diets or who wish to monitor their sodium intake for other reasons will be able to take the amount of sodium in their water into account.

The guideline of 20 milligrams per liter for sodium, when exceeded, does not require treatment of the water to reduce the levels to prevent adverse health effects on public health. Rather, the guideline represents a level of sodium in water that physicians and sodium sensitive individuals should be aware of in cases where sodium exposures are being carefully controlled.

TO: (Choose One)

☐ DEP Regional Office

☐ Massachusetts Department of Public Health, Bureau of Environmental Health Assessment

☐ _____ Board of Health
(CITY OR TOWN)

☐ _____
(OTHER)

FROM: _____
(PWS NAME)

(PWS ADDRESS)

(Choose one) ☐ Community PWS
☐ Non transient noncommunity
☐ Transient noncommunity PWS

(Name of PWS Owner or Responsible Person Submitting information)

DATE: ____/____/____

SUBJECT: Sodium Notification for Massachusetts Public Drinking Water Systems

In accordance with Massachusetts Department of Environmental Protection, Drinking Water Program regulations 310 CMR 22.06(A), please find attached the sodium results for the

_____ system, located at
(PWS NAME)

(PWS ADDRESS)

The attached sodium results are for the period _____.
(MONITORING PERIOD)

Please contact _____ at _____
(CONTACT PERSON NAME) (PHONE NUMBER)

if you have any questions.

Appendix F

Annual Statistical Report



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

GEO PAUL CELLUCCI
Governor

TRUDY COXE
Secretary

DAVID B. STRUHS
Commissioner

- THIS IS AN IMPORTANT NOTICE -

**1997 TRANSIENT NON-COMMUNITY PUBLIC WATER SUPPLY ANNUAL STATISTICAL REPORT
FOR NEWLY REGISTERED SYSTEMS AS OF 1/1/97 OR
SYSTEMS THAT DID NOT SUBMIT A REPORT IN 1996**

February 13, 1998

Dear Public Water Supplier:

Enclosed is your 1997 Transient Non-Community Public Water Supply Annual Statistical Report.

As a public water supplier, you are required to report annually to the Department of Environmental Protection (DEP). Your system has been classified as a Transient Non-Community (TNC) system because our records show that your water supply has at least 15 service connections OR serves an average of at least 25 individuals daily for at least 60 days of the year.

With the help of funds from the Federal Safe Drinking Water Act Assessment Program, DEP has begun to simplify the annual statistical reporting process. **This report form is also now available on the DEP Internet Home Page at <http://www.magnet.state.ma.us/dep/brp/dws/dwspubs.htm#forms>. It can be downloaded from the Internet, manually completed, and returned by mail to DEP.** The DEP's long-range goal is to make this report less time-consuming and more efficient for both you and the Drinking Water Program. Therefore, the actual length of the report has been shortened by removing some questions that are no longer significant.

1. Type or print your responses legibly in **BLACK** ink. Mark necessary changes with an asterisk.
2. Include your system's public water supply identification number (PWSID#) on all forms. Your PWSID# is the seven-digit number that appears at the top right-hand corner of the following page.
3. Complete Sections A-F. If necessary, please make additional copies of the sections and attach separate sheets.
4. Sign the **Certification** statement in Section B.
5. Make two copies of the original package. Return the original and one copy of the complete package by **March 16, 1998** to:
Department of Environmental Protection Drinking Water Program, One Winter Street, 6th Floor, Boston, MA 02108
Attn: WQA/STATS. (Note: Please keep one copy for your own files.)

By returning this report to DEP on time, you will have fulfilled your annual reporting requirements as a registered Public Water Supply, in accordance with Massachusetts Drinking Water Regulations CMR 310 22.00. Prompt and accurate submittals also assist the Drinking Water Program in planning and implementing its drinking water programs and establishing your SDWA assessment.

Thank you for working with the Drinking Water Program to protect Massachusetts' drinking water. If you have any comments or suggestions for improvement, please contact Mr. Otavio Paula-Santos at (617) 556-1085 or call Drinking Water Program's Water Quality Assurance Section at (617) 292-5770.

Very Truly Yours,

David Y. Terry, Program Director
DEP Drinking Water Program

Attachments

stats\97stalt2.doc (p.2)



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Drinking Water Program

PWS Name: _____

City/Town: _____

PWS ID#: _____

1997 Public Water Supply Annual Statistical Report

For Transient Non-Community Public Water Systems - Reporting Period: 1/1/97 - 12/31/97

SECTION A: Certification

I certify under penalty of law that I am the owner or person authorized to fill out this form and that the information contained herein is true, accurate, and complete to the best of my knowledge and belief.

Name (print) _____ Title _____

Signature _____ Date _____ Phone Number _____ Fax Number _____

Facility Owner's Name and Phone Number, if Different from Above _____

SECTION B: Public Water Supply Information

1. Facility Name:

Mailing Address:

City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____ E-Mail: _____

2. Is this system a not-for-profit organization? ☐ Yes ☐ No If yes, indicate Tax Exempt code (i.e., 501(c)?) _____

3. Federal Employment Identification Number (FEIN): _____

4. List of Certified Drinking Water Operators employed by the PWS * :
(Attach list of *all* additional facility operators and corresponding license numbers)

Primary Certified Operator - Distribution: Name: _____ Grade: _____ Lic.#: _____

Primary Certified Operator - Treatment (if applicable): Name: _____ Grade: _____ Lic.#: _____

Secondary Certified Operator - Treat. &/or Dist. (if applicable): Name: _____ Grade: _____ Lic.#: _____

*If contracted, provide ending date of contract: _____

**If you do not have a certified drinking water supply operator, please call (617) 556-1191 for information. Certified operators are required in accordance with 310 CMR 22.11B.

5. Indicate the type of facility you operate:

- ☐ a. Health Care Facility ☐ b. Public Buildings
☐ c. Religious Organization ☐ d. Commercial
☐ e. Recreational
☐ f. Other Type of Facility: (Specify) _____

7. Facility Operation Schedule: (check one)

☐ Seasonal ☐ Year-Round

If seasonal facility, what is your primary season:

Start: ____/____/____ End: ____/____/____
(MM) (DD) (YY) (MM) (DD) (YY)

6. Population: Winter: _____ Summer: _____

Facility operates Average # of: Days per Year _____
Hours per Day _____

*Note: Population = # of visitors + # of employees on a daily average.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Drinking Water Program

PWS Name: _____
City/Town: _____
PWS ID#: _____

1997 Public Water Supply Annual Statistical Report

SECTION B: Public Water Supply Information (Continued)

8. Is your water supply treated or disinfected? (ie. water softener, etc.)

☐ Yes ☐ No

If Yes, please specify the treatment purpose, process, and chemicals added:

Purpose: (ie. disinfection, corrosion control, iron removal)

Process: (ie. chlorination, pH adjustment, ozonation)

Chemicals Added: (ie. chlorine, sodium hydroxide, ozone)

9. a. Are there any cross connection or backflow prevention devices on your water distribution system?

☐ Yes ☐ No ☐ Not Sure

b. Has your water distribution system had a cross connection survey?

☐ Yes ☐ No

If Yes, indicate date of last survey: ____/____/____

10. Does this system:

☐ Bottle Water ☐ Vend Water
☐ Sell water to another PWS ☐ N/A

SECTION C: Emergency Information

Indicate the action you will take in the event that the facility is unable to provide an adequate quantity or quality of drinking water.

☐ Shut down/Close

☐ Provide Bottled Water

☐ Other, Explain below:

SECTION D: Source Information

Please provide the following information for each source. Use additional sheets if necessary.

Source Information	Source # 1	Source # 2	Source # 3	Total
A. Source Name (ie. Well # 1)				-----
B. Source ID# (ie. 4000000-01G)				-----
C. Type G = Groundwater S = Surface water				-----
D.a. Does this source have a master meter? (circle one)	YES NO	YES NO	YES NO	-----
b. If yes, indicate total volume produced in 1997. *Note: Estimates are NOT acceptable	Volume (gal./yr.)	Volume (gal./yr.)	Volume (gal./yr.)	Total Volume (gal./yr.)
c. Date meter installed.	/ /	/ /	/ /	/ /



1997 Public Water Supply Annual Statistical Report

SECTION E: Source Protection Information

1. Within your IWPA (the area used in the absence of a DEP approved Zone II), list the approximate linear distance (in feet) from your water source(s) to any of the following. Indicate distances on the sketch at Section F.

_____/_____
Property Line Road

_____/_____
Homes Body of Water

_____/_____
Municipal/Commercial Bldg. Type of Building

_____/_____
Sewer Line Surface Drain

_____/_____
Leaching Field/Septic System Fire Hydrant

_____/_____
Parking Area # of Vehicles

_____/_____
Catch Basin Groundwater Discharge Drain

If there is a parking area, is the area paved?

Storage Area (specify above or below ground)

Other Land Uses (specify)

2. List the distance (in feet) from water source(s) to any of the following, if located within IWPA (Refer to Land Use Inventory Instructions).

Agriculture _____

Sand/Salt Storage Area _____

Chemical Storage Area _____

Landfill/Dump/Junk Yard _____

Commercial/Industrial Facility (circle one) _____

3. Fuel Storage - Specify:

☐ Oil

☐ Gas

☐ Above Ground

☐ Below Ground

Distance (ft.) from water source _____

Location _____

Capacity (Gal.) _____

4. If you have a water storage tank, do you have antennae or other appurtenances (not needed for drinking water purposes) attached to your storage tank(s)?

Yes ☐ No ☐



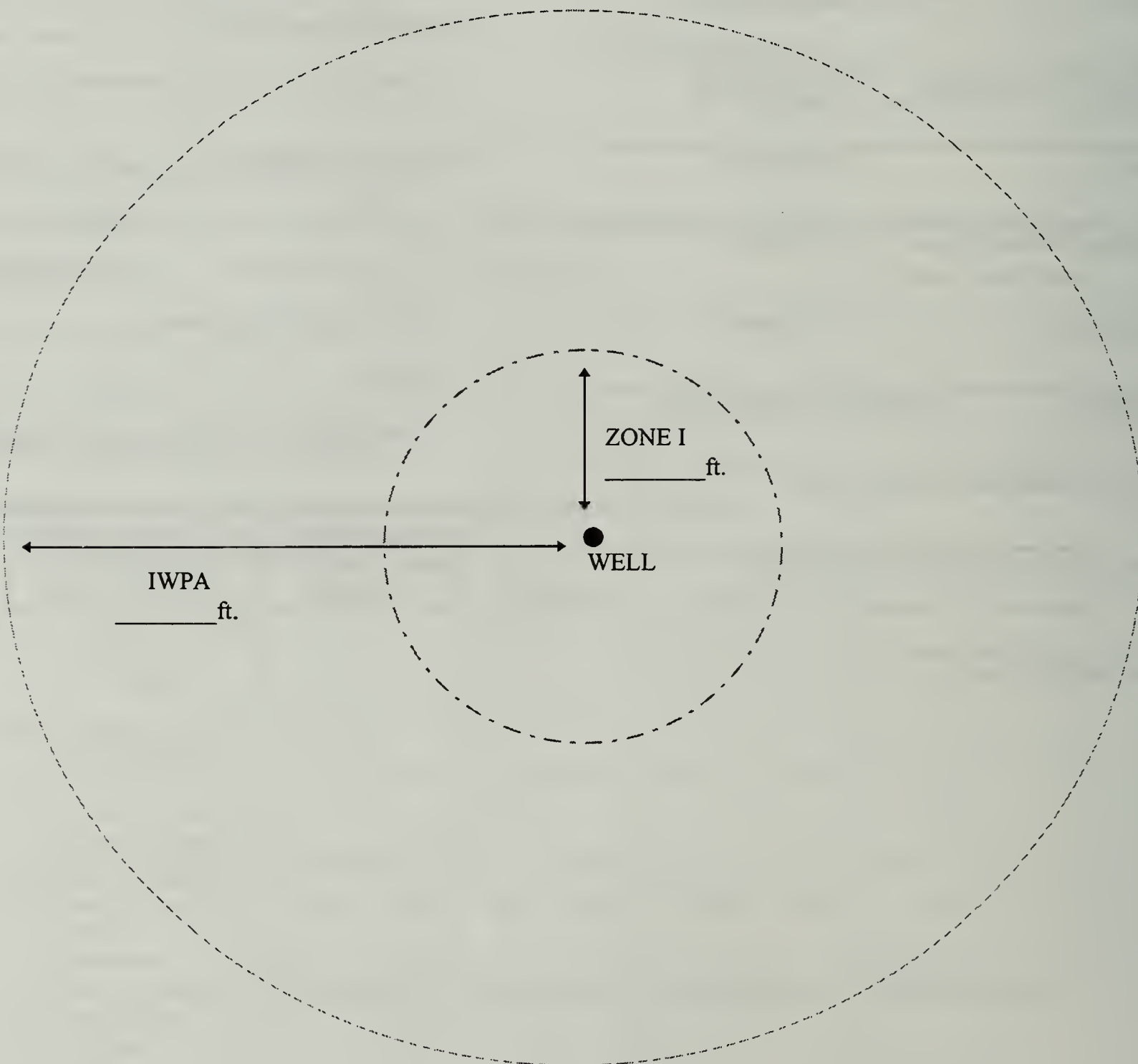
1997 Public Water Supply Annual Statistical Report

SECTION F: Property Drawing

Please create below or attach a detailed sketch of the property owned by the facility including the locations of the following:

- a. Each water source
- b. All structures (Refer to item #8 in Section E)
- c. Address (if different)
- d. Fuel tanks (specify oil/gasoline), ponds, streams, septic tanks/leaching facilities, etc.

Please provide a legend and/or clearly label all noted objects.

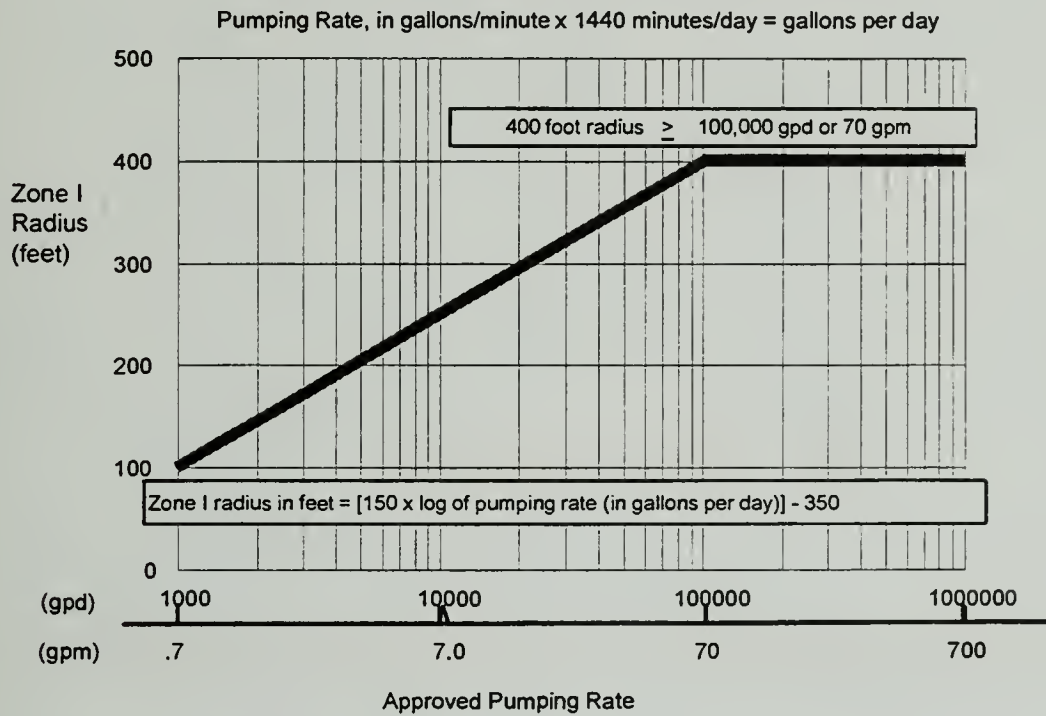


LEGEND:

INSTRUCTIONS FOR LAND USE INVENTORY (for use with Section F)

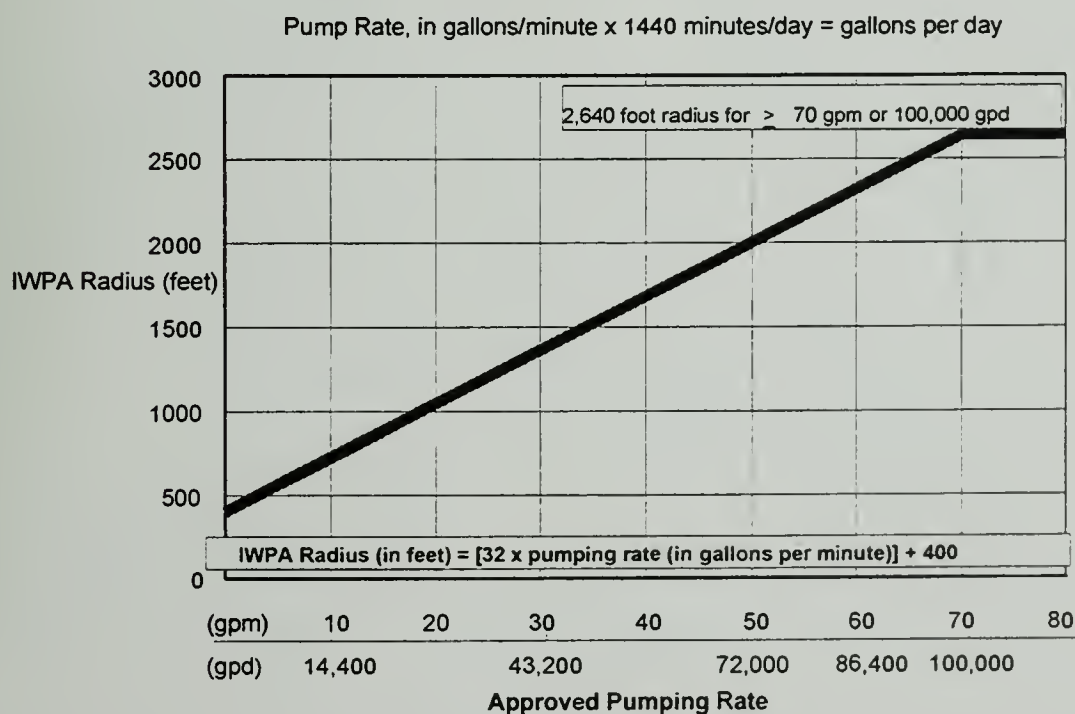
PROTECT THE RECHARGE AREA OF YOUR WATER SOURCE: The public water supplier must take an active role in ensuring that each water source is protected and the threat of contamination is minimized. An annual inspection of land uses in the Zone I and Interim Wellhead Protection Area (IWPA) for groundwater sources is an important part of source protection. **Zone I** is the protective radius around a public well or wellfield that must be owned by a water supplier or controlled through a conservation restriction. **IWPA** is used in the absence of a DEP approved Zone II as the area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated. **IDENTIFY EACH LAND USE ACTIVITY** that might threaten water quality. Do this by driving or walking through Zones I and IWPA and by contacting the local Board of Health, Fire Dept. or the state DEP for information. Use the list of land uses in **Section E** as a guide. You may also call DEP/DWS at (617) 292-5770 for advice on water supply protection.

Zone I Radius vs. Pumping Rate



A **DEFAULT ZONE I** radius of 100 feet may be used for a TNC well for which there is no metered rate of withdrawal, no DEP-approved pumping rate, OR no DEP-determined radius.

IWPA Radius vs. Pumping Rate



NOTE: PUMPING RATE IN GALLONS PER MINUTE (GPM) X 1440 MINUTES/DAY = GALLONS PER DAY (GPD)

A **DEFAULT IWPA** radius of 500 feet may be used for a TNC well for which there is no metered rate of withdrawal, no DEP-approved pumping rate, OR no DEP-determined radius

INSTRUCTIONS FOR USE WITH SECTION F

Appendix G

Certified Operator Compliance Handbook

Certified Operator Compliance Handbook

For
Noncommunity
Public Water
Systems



Commonwealth of Massachusetts
Department of Environmental Protection
Bureau of Resource Protection
Drinking Water Program
January 1998

Certified Operator Compliance Handbook

for Noncommunity Public Water Systems

Contents

- Section 1 Introduction
- Section 2 Why Have a Certified Operator?
- Section 3 How to Use this Handbook
- Section 4 Typical Responsibilities and Duties for the Operation
of a Non Community Public Water System
- Section 5 Step-By-Step to Becoming a Certified Drinking Water Operator
Procedures for Contracting a Certified Operator
- Section 6 Public Water System Certified Operator Compliance Notice
- Section 7 Inspection Form: Small Public Water Systems
- Section 8 Application for Temporary Emergency Certification

Introduction

This document is intended to help owners and operators of noncommunity public water systems understand the minimum duties and responsibilities as well as the appropriate documentation that are necessary when you are responsible for a drinking water system.

All public water systems are required to have a certified operator and non-community systems have two ways to acquire the services of a certified operator. The system can either contract with a certified operator or the owner or a staff member can take and pass the certified operator examination. While the system is working to acquire a certified operator, the system **must** obtain a *Temporary Emergency Certificate* (good for 6 months) to be allowed to continue to operate the system.

This document should help owners and certified operators to make an informed decision on the amount and timing of the duties required to operate a public water system. If the system chooses to contract for a certified operator this document will help in establishing the scope of work and appropriate cost for the contract. This booklet also includes copies of relevant forms including the ***Public Water System Certified Operator Compliance Notice*** (which can be used as the basis of a contract) and the routine *Inspection Form* which DEP is encouraging owners/certified operators to use to document the accomplishments of each site visit.

Why Have a Certified Operator?

Certified Operator Requirements

All public Water systems in Massachusetts are required by Massachusetts Public Drinking Water Regulations 310 CMR 22.00 to have a state board certified water systems operator. An operator is defined as a person who as part or their job duties, is assigned the responsibility for operational activities that will directly impact the quality and/or quantity of drinking water provided to consumers.

Why Have A Certified Operator?

A water system must provide an adequate supply of safe water. New disease organisms, industrial and agricultural chemicals, cross connections and old pipes, are just a few of the threats to drinking water that have become more serious in recent years.

Complying with state and federal regulations is not easy; it takes training. Certified operators have that training and play an important role in protecting the health of the water supply users and assuring that the water system tests for possible disease organisms and harmful chemicals.

In order to maintain their license, certified operators must continually be trained and accumulate training contact hours. They also serve an important role in keeping the system in compliance with the ever changing drinking water regulations, and they impart a sense of well-being that the water system is operated by a trained individual.

Operating a public water system without trained personnel and the knowledge required for safe operation could lead to serious illness and may even result in death.

As an owner/supplier of a public water system you must either contract an operator or become a certified operator yourself.

Contracting A Certified Operator

To obtain a list of Massachusetts certified operators in your area call the State House Bookstore at 617-727-2834 and ask for a copy of the *"Directory of Public Water System Certified Operators for Contract Services"* (which can be purchased for \$13.15 or mailed out for \$16.20).

The form entitled, *"Public Water Supply Certified Operator Compliance Notice,"* is used to notify the DEP that you are complying with the regulations by contracting the services of a certified operator. As soon as you contract a certified operator to manage your public water supply, fill out the form and mail it to:

Board of Certification of Drinking Water Supply Facilities, 100 Cambridge St., Room 1406, Boston, MA 02202. Department of Environmental Protection approval for contract certified operators must be granted before the service arrangement becomes effective.

How To Become A Certified Operator

Either the owner or an employee of a public water system can become a certified operator. To become a certified operator, you must pass the certification examination and then have your application for operator certification approved by the Board of Certification of Operators of Drinking Water Supply Facilities (Board).

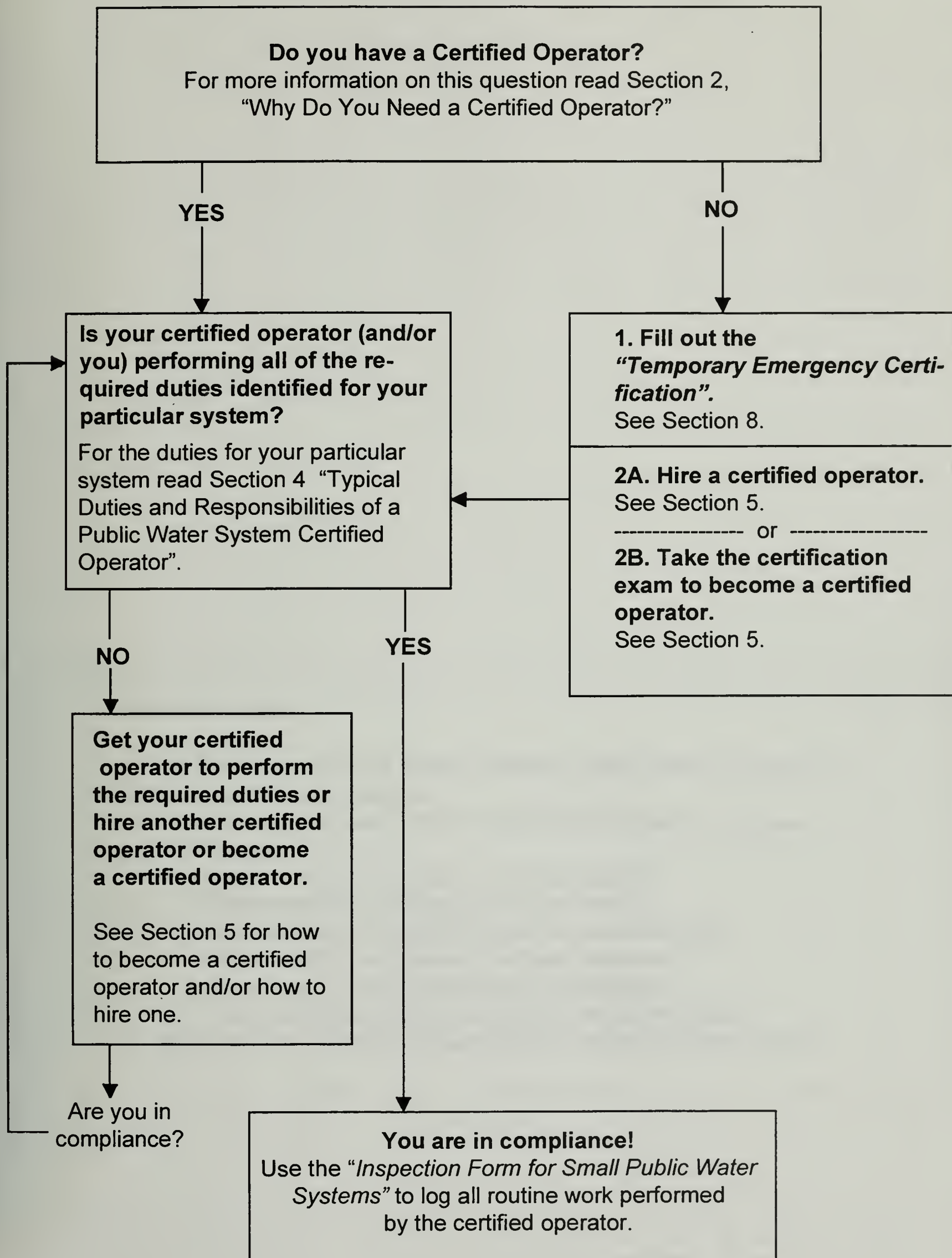
Your application will be approved if you meet the education and experience requirements for the grade of certification for which you apply.

Certification examinations are given three times each year, usually on the first Saturday in April, July, and November. The fee to take the examination is around \$60. Once you pass the examination there is an application fee of \$10 and a license fee of \$15 which is sent to the Board with your application.

For a certification examination registration form and Bulletin of Information, call the National Assessment Institute at 508-624-0826. If you need training information, call:

New England Water Works Association 508-478-6996
Massachusetts Water Works Association 508-692-0199
Northeast Rural Water Association 802-660-4988

If you have any questions or would like more information on operator certification, please contact James Holeva, Chairman of the Board of Certification of Operators of Drinking Water Supply Facilities at 617-556-1191.



Instruction Sheet:

1. The following section (6 pages) displays typical duties and responsibilities of public water systems.
2. Select your operational system type from the following 6 (pages) types of systems:
 - 1 Seasonal non-community, without treatment;
 - 2 Seasonal non-community with disinfection;
 - 3 Seasonal non-community with chemical treatment;
 - 4 Year round non-community without treatment;
 - 5 Year round non-community with disinfection;
 - 6 Year round non-community with chemical treatment.
3. Disregard the rest of the sheets that do not apply to your system.

TYPICAL DUTIES AND RESPONSIBILITIES OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE: SEASONAL NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT: NONE
GRADE OPERATOR REQUIRED: VSS (Very Small System)

The certified operator shall:

- be responsible for the **day-to-day** operation and management of the public water system.
- ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- inspect the source, storage facilities and distribution system **prior to start of season and at the end of season**.
- inspect the water system **monthly** during the period that the system is in operation.
- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location and all other appropriate appurtenances.
- collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- report all results to the Department of Environmental Protection **within the time frames specified**.
- conduct a sanitary survey of the public water system **as specified** by the Department of Environmental Protection.
- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- notify the Department of Environmental Protection of violations and issue public notices **when necessary**.
- review the sample monitoring schedule and locations **annually**.
- protect the water distribution system and storage facilities from corrosion effects.
- observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- record quantity of water pumped from source **monthly**.
- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety and program, a source protection program plan.
- ensure the accuracy of water meters and other flow measuring devices **annually or as necessary**.
- delineate the wellhead protection zone.
- identify all potential sources of contamination within the wellhead protection zone.
- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- keep abreast of changes in the drinking water regulations.
- attend training programs and workshops for certification renewal **as needed**.
- accompany regulatory agencies during on-site inspections.
- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- develop and maintain a complaint log book
- keep accurate records and maintain a filing system for correspondence.
- develop, maintain and keep up to date a public water system standard operational and maintenance manual that contains at a minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for Public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent correspondence or documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately 6 to 12 hours depending on the length of the season. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

CONTRACT SERVICES: A public water system may contract for the services of a certified operator to perform all or some of the duties listed above with written approval from the Department of Environmental Protection. A **contracted certified operator** should spend approximately **one hour** per on-site visit to perform the various duties listed above. This time may vary from system to system as will the frequency of visits depending on the specific needs of each system as identified by the Department. In some cases, the certified operator can supervise the operation without being present on a daily basis provided the certified operator has a person working with the system on a daily basis under his or her supervision.

TYPICAL DUTIES AND RESPONSIBILITIES OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE: SEASONAL NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT: DISINFECTION PROCESS
CERTIFIED OPERATOR REQUIRED: VSS (Very Small System)

The certified operator shall:

- be responsible for the **day-to-day** operation and management of the public water system.
- ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- inspect the source, storage, disinfection process and distribution system **prior to start of season and at the end of season.**
- inspect the water system **daily** during the period that the system is in operation.
- measure and record the chlorine dosage **daily** making dosage adjustments as necessary.
- add chemicals when necessary and rotate stand-by pumps **monthly.**
- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary.**
- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location, disinfection process and all other appropriate appurtenances.
- collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- report all results to the Department of Environmental Protection **within the time frames specified.**
- conduct a sanitary survey of the public water system **as specified** by the Department of Environmental Protection.
- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner.**
- notify the Department of Environmental Protection of a violation and issue public notices **when necessary.**
- review the sample monitoring schedule and locations **annually.**
- protect the water distribution system and storage facilities from corrosion effects.
- observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely.**
- inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary.**
- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- record quantity of water pumped from source **monthly.**
- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, and a wellhead protection program plan.
- ensure the accuracy of water meters and other flow measuring devices **as necessary.**
- delineate the wellhead protection zone.
- identify all potential sources of contamination within the wellhead protection zone.
- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- keep abreast of changes in the drinking water regulations.
- attend training programs and workshops for certification renewal **when appropriate.**
- accompany regulatory agencies during on-site inspections.
- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion.**
- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- develop and maintain a complaint log book
- keep accurate records and maintain a filing system for correspondence.
- develop, maintain and keep up to date a public water system standard operational and maintenance manual containing at a minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for Public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately **180 to 360 hours.** Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

CONTRACT SERVICES: A public water system may contract for the services of a certified operator to perform all or some of the duties listed above with written approval from the Department of Environmental Protection. A **contracted certified operator** should spend approximately **one hour** per on-site visit to perform the various duties listed above. This time may vary from system to system as will the frequency of visits depending on the specific needs of each system as identified by the Department. In some cases, the certified operator can supervise the operation without being present on a daily basis provided the certified operator has a person working with the system on a daily basis under his or her supervision.

TYPICAL DUTIES AND RESPONSIBILITIES OF A OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE: YEAR ROUND NON-COMMUNITY PUBLIC WATER SYTSEM
TREATMENT: DISINFECTION PROCESS
GRADE OPERATOR REQUIRED: VSS (Very Small System)

The certified operator shall:

- be responsible for the **day-to-day** operation and management of the public water system.
- ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- inspect the water system **daily** (source, storage, treatment and distribution).
- measure and record the chlorine dosage **daily** making dosage adjustments as necessary.
- add chemicals **when necessary** and rotate stand-by pumps **monthly**.
- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location, disinfection process and all other appropriate appurtenances.
- collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- report all results to the Department of Environmental Protection **within the time frames specified**.
- conduct a □sanitary survey of the public water systems **as specified** by the Department of Environmental Protection.
- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- notify the Department of Environmental Protection of a violation and issue public notices **when necessary**.
- review the sample monitoring schedule and locations **annually**.
- protect the water distribution system and storage facilities from corrosion effects.
- observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- record quantity of water pumped from source **monthly**.
- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, and a wellhead protection program plan.
- ensure the accuracy of water meters and other flow measuring devices **as necessary**.
- delineate the wellhead protection zone.
- identify all potential sources of contamination within the wellhead protection zone.
- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- keep abreast of changes in the drinking water regulations.
- attend training programs and workshops for certification renewal **when appropriate**.
- accompany regulatory agencies during on-site inspections.
- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- develop and maintain a complaint log book
- keep accurate records and maintain a filing system for correspondence.
- develop, maintain and keep up to date a public water system standard operational and maintenance manual which contains at minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for Public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately **180 to 360 hours**. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

CONTRACT SERVICES: A public water system may contract for the services of a certified operator to perform all or some of the duties listed above with written approval from the Department of Environmental Protection. A **contracted certified operator** should spend approximately **one hour** per on-site visit to perform the various duties listed above. This time may vary from system to system as will the frequency of visits depending on the specific needs of each system as identified by the Department. In some cases, the certified operator can supervise the operation without being present on a daily basis provided the certified operator has a person working with the system on a daily basis under his or her supervision.

TYPICAL DUTIES AND RESPONSIBILITIES OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE:	YEAR ROUND NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT:	CHEMICAL TREATMENT
GRADE REQUIRED:	VSS (Very Small system) & 1-T

The certified operator shall:

- be responsible for the **day-to-day** operation and management of the public water system.
- ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- inspect the water system **daily** (source, storage facilities, treatment process and distribution).
- measure and record the chemical dosage **daily** making dosage adjustments as necessary.
- add chemicals **when necessary** and rotate stand-by pumps **monthly**.
- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample - location, disinfection process and all other appropriate appurtenances.
- collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- report all results to the Department of Environmental Protection **within the time frames specified**.
- conduct a □sanitary survey of the public water systems **specified** by the Department of Environmental Protection.
- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- notify the Department of Environmental Protection of a violation and issue public notices **when necessary**.
- review the sample monitoring schedule and locations **annually**.
- protect the water distribution system and storage facilities from corrosion effects.
- observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- record quantity of water pumped from source **monthly**.
- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, and a wellhead protection program plan.
- ensure the accuracy of water meters and other flow measuring devices **as necessary**.
- delineate the wellhead protection zone.
- identify all potential sources of contamination within the wellhead protection zone.
- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- keep abreast of changes in the drinking water regulations.
- attend training programs and workshops for certification renewal **when appropriate**.
- accompany regulatory agencies during on-site inspections.
- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- develop and maintain a complaint log book
- keep accurate records and maintain filing system for correspondences.
- develop, maintain and keep up to date a public water system standard operational and maintenance manual which contains at a minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately **180 to 360 hours**. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

CONTRACT SERVICES: A public water system may contract for the services of a certified operator to perform all or some of the duties listed above with written approval from the Department of Environmental Protection. A **contracted certified operator** should spend approximately **one hour** per on-site visit to perform the various duties listed above. This time may vary from system to system as will the frequency of visits depending on the specific needs of each system as identified by the Department. In some cases, the certified operator can supervise the operation without being present on a daily basis provided the certified operator has a person working with the system on a daily basis under his or her supervision.

Step By Step to Becoming A Certified Drinking Water Operator

- 1 Call or write the National Assessment Institute (NAI), 2 Mount Royal Avenue, Suite 250, Marlborough, MA 01752, 508-624-0826 to receive the Bulletin of Information containing all the necessary information concerning the operator certification examination and a list of study material to prepare for the examination.
- 2 Fill out the Board of Certification of Operators of Drinking Water Supply Facilities (Board) Education and Experience Worksheet enclosed in the Bulletin of Information to determine which grade of certification examination you should take. (Keep the worksheet for use in completing both the Exam Registration form and Application for Operator Certification).
- 3 Complete the Commonwealth of Massachusetts Drinking Water Operator Registration Form which is also enclosed in the Bulletin of Information and send it to The National Assessment Institute, 2 Mount Royal Avenue, Suite 250, Marlborough, MA 01752 with a money order, city/town issued check, or cashier's check for \$60.00 no less than forty (40) days prior to the test date. (No personal checks will be accepted).
- 4 NAI will then mail you an exam admission notice, which will indicate the specific date, time and location of the exam.
- 5 After you have taken and successfully passed the certification examination, NAI will mail you an Application for Operator Certification. Refer to the Education and Experience Worksheet which was enclosed in the Bulletin of Information to determine the grade and status of certification for which you should apply.
- 6 Complete the Application for Operator Certification and send it along with a \$25.00 check for the application and license fee payable to the Commonwealth of Massachusetts to Board of Certification of Operators of Drinking Water Supply Facilities, Division of Registration, Leverett Saltonstall Building, Government Center, 100 Cambridge Street, Room 1406, Boston, MA 02202.
- 7 The Board will review your application and grant you certification as either a full status or operator-in-training status operator in the grade for which you passed the certification examination.
- 8 You will receive your operator certification by mail in 6-8 weeks from the time your application is accepted.
- 9 If you have any questions concerning operator certification please call 617-292-5770.
tncmanua/Stepstep

Procedures for Contracting a Certified Operator

Federal and state regulations (Massachusetts Drinking Water Regulation 310 CMR 22.11B) require all public water supplies to be operated by a certified drinking water operator. This operator must have a grade of certification that corresponds with the classification of the system. If your system does not have a certified operator, there are two methods for obtaining a certified operator. A staff person of the system can become a certified operator (refer to Step-by-Step to Becoming a Certified Operator) or the system can hire a certified operator on a contract basis.

To hire a certified operator on a contract basis the public water system must:

- 1 Choose a full status certified operator with a grade of certification that corresponds with the classification of your system. You can choose an operator on your own or refer to the Directory of Public Water System Certified Operators for Contract Services for certified operators in your area that are willing to operate public water systems on a contract basis. The Directory can be purchased at the Massachusetts State Bookstore for \$13.15 or mailed for \$16.20. Contact or visit the State Bookstore, State House, Room 116, 1st. Floor, Boston, MA 02133 (Boston number 617-727-2834 or Springfield number 413-784-1376).
- 2 Come to a contract agreement with the certified operator you have chosen.
- 3 The certified operator and the person responsible for the public water system must complete the Certified Operator Compliance Notice. (Call 617-292-5770 if a form is needed)
- 4 Send the completed Certified Operator Compliance Notice to the Board of Certification of Operators of Drinking Water Supply Facilities (Board), Division of Registration, 100 Cambridge Street, Boston, MA 02202 for verification of the certified operator's current status.
- 5 Upon verification of the certified operator's status, the Board will sign the notice and return it to the system.
- 6 The public water system must then send the Board verified notice to the DEP, Drinking Water Program regional office, for review and approval.

It is extremely important to note that if a system does not currently have the required certified operator, but is taking action to obtain one, it is necessary to apply to the Board for a Temporary Emergency Certification. The Temporary Emergency Certification allows a system to operate in compliance with 310 CMR 22.11B until a certified operator can be obtained. The Temporary Emergency Certification allows a system to assign someone to operate the facility under the certification for 6 months. This certification is not renewable. Call the Division of Registration at 617-727-3067 or DEP at 617-292-5770 for a Temporary Emergency Certification Application.

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Instruction Sheet:

The following 9 pages which include the document, "*Public Water System Certified Operator Compliance Notice (PWSCOCN)*", must be used when hiring a Massachusetts Certified Drinking Water Operator to manage your public water system.

Please note that there are 6 pages of "*Typical Duties and Responsibilities of a Public Water System Certified Operator*" enclosed in the PWSCOCN.

Choose the page that describes your particular system's type. Fill out that form with the operator and include it in this compliance notice. Only that page should be filled out and included with your PWSCOCN.



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

ARGEO PAUL CELLUCCI
Governor

TRUDY COXE
Secretary

DAVID B. STRUHS
Commissioner

PUBLIC WATER SYSTEM CERTIFIED OPERATOR COMPLIANCE NOTICE

The following public water system is notifying the Department of Environmental Protection of its intent to retain the services of an independent contractor to serve as its certified operator:

Public Water System: _____ PWSID# _____

Address: _____ City/Town: _____ ZIP: _____

Owner: _____ Title: _____

System Type: ☐ Community, ☐ Non-Transient Noncommunity, ☐ Transient Noncommunity

Population: _____ Distribution Class: _____ Treatment Class: _____

Treatment: Yes ☐ No ☐ Filtration: Yes ☐ No ☐

If yes, please specify: _____

This form constitutes a notice of intent from the above named public water system to the Commonwealth of Massachusetts, Department of Environmental Protection (Department), for the purpose of providing a means whereby said public water system can fulfill its statutory obligation under MGL Chapter 112 Section 87DDDD and 310 CMR 22.11B Massachusetts Drinking Water Regulations, to have said system operated under the supervision of an operator certified by the Board of Certification of Operators of Drinking Water Supply Facilities to ensure the proper management, operation, and maintenance of treatment and/or distribution of a public water system.

Said public water system intends to comply with the above requirements by contracting with (operator's name) _____ (grade) _____ (Cert. #) _____, a Massachusetts Certified Operator.

Said operator will function as the (primary, secondary) supervisor as required by law, regulation, policy and/or guidelines; will be available on a regular basis, _____ hours per day, _____ days per (week, month); and will be able to respond to an emergency within _____ minutes.

The certified operator shall be responsible for the operation and management of the public water system to ensure that said system is in compliance with **310 CMR 22.00, Massachusetts Drinking Water Regulations**. To ensure proper operation of said public water system, the certified operator in responsible charge agrees to perform the duties as specified within this document including those duties and responsibilities indicated within the "Typical Duties and Responsibilities of a Public Water System Certified Operator" form. In some cases, the certified operator can supervise the operation without being present on a daily basis provided the certified operator has a person working with the system on a daily basis under his or her supervision.

TYPICAL DUTIES AND RESPONSIBILITIES- OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE:	SEASONAL NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT:	NONE
GRADE OPERATOR REQUIRED:	VSS (Very Small System)

The contracted certified operator or system delegate (public water system owner or employee) under his or her direct supervision shall perform the following duties. Indicate by a check mark in box 1 those duties that will be performed by the contracted certified operator. Indicate by a check mark in box 2 those duties that will be performed by the person who is under the direct supervision of the certified operator. Check box 3 when duties are shared.

1 2 3

- ☐☐☐ -be responsible for the **day- to-day** operation and management of the public water system.
- ☐☐☐ -ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- ☐☐☐ - inspect the source, storage facilities and distribution system **prior to start of season and at the end of season**.
- ☐☐☐ - inspect the water system **monthly** during the period that the system is in operation.
- ☐☐☐ - test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- ☐☐☐ - develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location and all other appropriate appurtenances.
- ☐☐☐ - collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ☐☐☐ - ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- ☐☐☐ - report all results to the Department of Environmental Protection **within the time frames specified**.
- ☐☐☐ - conduct a "sanitary survey" of the public water system **as specified** by the Department of Environmental Protection.
- ☐☐☐ - complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- ☐☐☐ - notify the Department of Environmental Protection of violations and issue public notices **when necessary**.
- ☐☐☐ - review the sample monitoring schedule and locations **annually**.
- ☐☐☐ - protect the water distribution system and storage facilities from corrosion effects.
- ☐☐☐ - observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- ☐☐☐ - inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- ☐☐☐ - be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- ☐☐☐ - be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- ☐☐☐ - record quantity of water pumped from source **monthly**.
- ☐☐☐ - develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, and a source protection program plan.
- ☐☐☐ - ensure the accuracy of water meters and other flow measuring devices **annually or as necessary**.
- ☐☐☐ - delineate the wellhead protection zone.
- ☐☐☐ - identify all potential sources of contamination within the wellhead protection zone.
- ☐☐☐ - troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- ☐☐☐ - keep abreast of changes in the drinking water regulations.
- ☐☐☐ - attend training programs and workshops for certification renewal **as needed**.
- ☐☐☐ - accompany regulatory agencies during on-site inspections.
- ☐☐☐ - troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- ☐☐☐ - discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- ☐☐☐ - develop and maintain a complaint log book
- ☐☐☐ - keep accurate records and maintain a filing system for correspondence.
- ☐☐☐ - develop, maintain and keep up to date a public water system standard operational and maintenance manual that contains at a minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for Public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent correspondence or documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately 6 to 12 hours depending on the length of the season. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

TYPICAL DUTIES AND RESPONSIBILITIES OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE:	SEASONAL NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT:	DISINFECTION PROCESS
CERTIFIED OPERATOR REQUIRED:	VSS (Very Small System)

The contracted certified operator or system delegate (public water system owner or employee) under his or her direct supervision shall perform the following duties. Indicate by check mark in box number 1 those duties that will be performed by the contracted certified operator. Indicate by check mark in box number 2 those duties that will be performed by the person who is under the direct supervision of the certified operator. Check box number 3 when duties are shared.

1 2 3

- ☐☐☐- be responsible for the **day-to-day** operation and management of the public water system.
- ☐☐☐- ensure the deliver of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- ☐☐☐- inspect the source, storage, disinfection process and distribution system **prior to start of season and at the end of season**.
- ☐☐☐- inspect the water system **daily** during the period that the system is in operation.
- ☐☐☐- measure and record the chlorine dosage **daily** making dosage adjustments as necessary.
- ☐☐☐- add chemicals when necessary and rotate stand-by pumps **monthly**.
- ☐☐☐- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- ☐☐☐- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location, disinfection process and all other appropriate appurtenances.
- ☐☐☐- collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ☐☐☐- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- ☐☐☐- report all results to the Department of Environmental Protection **within the time frames specified**.
- ☐☐☐- conduct a "sanitary survey" of the public water system **as specified** by the Department of Environmental Protection.
- ☐☐☐- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- ☐☐☐- notify the Department of Environmental Protection of a violation and issue public notices **when necessary**.
- ☐☐☐- review the sample monitoring schedule and locations **annually**.
- ☐☐☐- protect the water distribution system and storage facilities from corrosion effects.
- ☐☐☐- observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- ☐☐☐- inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- ☐☐☐- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- ☐☐☐- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- ☐☐☐- record quantity of water pumped from source **monthly**.
- ☐☐☐- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, and a wellhead protection program plan.
- ☐☐☐- ensure the accuracy of water meters and other flow measuring devices **as necessary**.
- ☐☐☐- delineate the wellhead protection zone.
- ☐☐☐- identify all potential sources of contamination within the wellhead protection zone.
- ☐☐☐- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- ☐☐☐- keep abreast of changes in the drinking water regulations.
- ☐☐☐- attend training programs and workshops for certification renewal **when appropriate**.
- ☐☐☐- accompany regulatory agencies during on-site inspections.
- ☐☐☐- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- ☐☐☐- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- ☐☐☐- keep accurate records and maintain a filing system for correspondence.
- ☐☐☐- develop, maintain and keep up to date a public water system standard operational and maintenance manual containing at a minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for Public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately 180 to 360 hours. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

TYPICAL DUTIES AND RESPONSIBILITIES OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE:	SEASONAL NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT:	CHEMICAL TREATMENT
GRADE OPERATOR REQUIRED:	VSS (Very Small system) & 1-T

The contracted certified operator or system delegate (public water system owner or employee) under his or her direct supervision shall perform the following duties. Indicate by check mark in box number 1 those duties that will be performed by the contracted certified operator. Indicate by check mark in box number 2 those duties that will be performed by the person who is under the direct supervision of the certified operator. Check box number 3 when duties are shared.

1 2 3

- ☐ ☐ ☐- be responsible for the **day- to-day** operation and management of the public water system.
- ☐ ☐ ☐- ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- ☐ ☐ ☐- inspect the source, storage, treatment process and distribution system **prior to start of season and at the end of season**.
- ☐ ☐ ☐- inspect the water system **daily** during the period that the system is in operation.
- ☐ ☐ ☐- measure and record the chemical dosage **daily** making dosage adjustments as necessary.
- ☐ ☐ ☐- add chemicals when necessary and rotate stand-by pumps **monthly**.
- ☐ ☐ ☐- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- ☐ ☐ ☐- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location, disinfection process and all other appropriate appurtenances.
- ☐ ☐ ☐- collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ☐ ☐ ☐- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- ☐ ☐ ☐- report all results to the Department of Environmental Protection **within the time frames specified**.
- ☐ ☐ ☐- conduct a sanitary survey of the public water system **as specified** by the Department of Environmental Protection.
- ☐ ☐ ☐- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- ☐ ☐ ☐- notify the Department of Environmental Protection of a violation and issue public notices **when necessary**.
- ☐ ☐ ☐- review the sample monitoring schedule and locations **annually**.
- ☐ ☐ ☐- protect the water distribution system and storage facilities from corrosion effects.
- ☐ ☐ ☐ observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- ☐ ☐ ☐ inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- ☐ ☐ ☐- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- ☐ ☐ ☐- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- ☐ ☐ ☐- record quantity of water pumped from source **monthly**.
- ☐ ☐ ☐- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, and a wellhead protection program plan.
- ☐ ☐ ☐- ensure the accuracy of water meters and other flow measuring devices **as necessary**.
- ☐ ☐ ☐- delineate the wellhead protection zone.
- ☐ ☐ ☐- identify all potential sources of contamination within the wellhead protection zone.
- ☐ ☐ ☐- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- ☐ ☐ ☐- keep abreast of changes in the drinking water regulations.
- ☐ ☐ ☐- attend training programs and workshops for certification renewal **when appropriate**.
- ☐ ☐ ☐- accompany regulatory agencies during on-site inspections.
- ☐ ☐ ☐- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- ☐ ☐ ☐- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- ☐ ☐ ☐- develop and maintain a complaint log book
- ☐ ☐ ☐- keep accurate records and maintain a filing system for correspondence.
- ☐ ☐ ☐- develop, maintain and keep up to date a public water system standard operational and maintenance manual containing at a minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for Public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately 180 to 360 hours. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

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TYPICAL DUTIES AND RESPONSIBILITIES OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE:	YEAR ROUND NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT:	NONE
GRADE OPERATOR REQUIRED:	VSS (Very Small System)

The contract certified operator or system delegate (public water system owner or employee) under his or her direct supervision shall perform the following duties. Indicate by check mark in box number 1 those duties that will be performed by the certified operator. Indicate by check mark in box number 2 those duties that will be performed by the person who is under the direct supervision of the certified operator. Check box number 3 when duties are shared.

1 2 3

- ☐ ☐ ☐- be responsible for the **day-to-day** operation and management of the public water system.
- ☐ ☐ ☐- ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- ☐ ☐ ☐- inspect the water system **monthly** (source, storage and distribution).
- ☐ ☐ ☐- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- ☐ ☐ ☐- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location and all other appropriate appurtenances.
- ☐ ☐ ☐- collect and/or oversee the collection of water samples as **specified** by the Department of Environmental Protection.
- ☐ ☐ ☐- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- ☐ ☐ ☐- report all water quality results to the Department of Environmental Protection **within the time frames specified**.
- ☐ ☐ ☐- conduct a sanitary survey of the public water system as **specified** by the Department of Environmental Protection.
- ☐ ☐ ☐- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- ☐ ☐ ☐- notify the Department of Environmental Protection of violations and issue public notices **when necessary**.
- ☐ ☐ ☐- review the sample monitoring schedule and locations **annually**.
- ☐ ☐ ☐- protect the water distribution system and storage facilities from corrosion effects.
- ☐ ☐ ☐- observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- ☐ ☐ ☐- inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- ☐ ☐ ☐- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- ☐ ☐ ☐- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- ☐ ☐ ☐- record quantity of water pumped from source **monthly**.
- ☐ ☐ ☐- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, a source protection program plan and a standard operational plan for the public water system.
- ☐ ☐ ☐- ensure the accuracy of water meters and other flow measuring devices **annually or as necessary**.
- ☐ ☐ ☐- delineate the wellhead protection zone.
- ☐ ☐ ☐- identify all potential sources of contamination within the wellhead protection zone.
- ☐ ☐ ☐- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- ☐ ☐ ☐- keep abreast of changes in the drinking water regulations.
- ☐ ☐ ☐- attend training programs and workshops for certification renewal **as needed**.
- ☐ ☐ ☐- accompany regulatory agencies during on-site inspections.
- ☐ ☐ ☐- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- ☐ ☐ ☐- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- ☐ ☐ ☐- develop and maintain a complaint log book
- ☐ ☐ ☐- keep accurate records and maintain a filing system for correspondence.
- ☐ ☐ ☐- develop, maintain and keep up to date a public water system standard operational and maintenance manual which contains at a minimum (a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; (b) the Department's Guidelines and Policies for Public Water Systems; (c) the Standard Monitoring Framework; and (d) other pertinent correspondence or documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately **12 to 24 hours**. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

(Cert#4C.doc)

TYPICAL DUTIES AND RESPONSIBILITIES OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE:	YEAR ROUND NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT:	DISINFECTION PROCESS
GRADE OPERATOR REQUIRED:	VSS (Very Small System)

The contracted certified operator or system delegate (public water system owner or employee) under his or her direct supervision shall perform the following duties. Indicate by check mark in box number 1 those duties that will be performed by the contracted certified operator. Indicate by check mark in box number 2 those duties that will be performed by the person who is under the direct supervision of the certified operator. Check box number 3 when duties are shared.

1 2 3

- ☐ ☐ ☐- be responsible for the **day-to-day** operation and management of the public water system.
- ☐ ☐ ☐- ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- ☐ ☐ ☐- inspect the water system **daily** (source, storage, treatment and distribution).
- ☐ ☐ ☐- measure and record the chlorine dosage **daily** making dosage adjustments as necessary.
- ☐ ☐ ☐- add chemicals **when necessary** and rotate stand-by pumps **monthly**.
- ☐ ☐ ☐- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- ☐ ☐ ☐- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location, disinfection process and all other appropriate appurtenances.
- ☐ ☐ ☐- collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ☐ ☐ ☐- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- ☐ ☐ ☐- report all results to the Department of Environmental Protection **within the time frames specified**.
- ☐ ☐ ☐- conduct a "sanitary survey of the public water system **as specified** by the Department of Environmental Protection.
- ☐ ☐ ☐- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- ☐ ☐ ☐- notify the Department of Environmental Protection of a violation and issue public notices **when necessary**.
- ☐ ☐ ☐- review the sample monitoring schedule and locations **annually**.
- ☐ ☐ ☐- protect the water distribution system and storage facilities from corrosion effects.
- ☐ ☐ ☐- observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- ☐ ☐ ☐- inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- ☐ ☐ ☐- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- ☐ ☐ ☐- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- ☐ ☐ ☐- record quantity of water pumped from source **monthly**.
- ☐ ☐ ☐- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, and a wellhead protection program plan.
- ☐ ☐ ☐- ensure the accuracy of water meters and other flow measuring devices **as necessary**.
- ☐ ☐ ☐- delineate the wellhead protection zone.
- ☐ ☐ ☐- identify all potential sources of contamination within the wellhead protection zone.
- ☐ ☐ ☐- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- ☐ ☐ ☐- keep abreast of changes in the drinking water regulations.
- ☐ ☐ ☐- attend training programs and workshops for certification renewal **when appropriate**.
- ☐ ☐ ☐- accompany regulatory agencies during on-site inspections.
- ☐ ☐ ☐- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- ☐ ☐ ☐- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- ☐ ☐ ☐- develop and maintain a complaint log book
- ☐ ☐ ☐- keep accurate records and maintain a filing system for correspondence.
- ☐ ☐ ☐- develop, maintain and keep up to date a public water system standard operational and maintenance manual which contains at a minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for Public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately 180 to 360 hours. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

(Cert#5c.doc)

TYPICAL DUTIES AND RESPONSIBILITIES OF A PUBLIC WATER SYSTEM CERTIFIED OPERATOR

PWS TYPE:	YEAR ROUND NON-COMMUNITY PUBLIC WATER SYSTEM
TREATMENT:	CHEMICAL TREATMENT
GRADE REQUIRED:	VSS (Very Small system) & 1-T

The contracted certified operator or system delegate (public water system owner or employee) under his or her direct supervision shall perform the following duties. Indicate by check mark in box number 1 those duties that will be performed by the contracted certified operator. Indicate by check mark in box number 2 those duties that will be performed by the person who is under the direct supervision of the certified operators. Check box number 3 when duties are shared.

1 2 3

- ☐☐☐- be responsible for the **day-to-day** operation and management of the public water system.
- ☐☐☐- ensure the delivery of safe drinking water **at all times** by complying with the Drinking Water Regulations of Massachusetts.
- ☐☐☐- inspect the water system **daily** (source, storage facilities, treatment process and distribution).
- ☐☐☐- measure and record the chemical dosage **daily** making dosage adjustments as necessary.
- ☐☐☐- add chemicals **when necessary** and rotate stand-by pumps **monthly**.
- ☐☐☐- test, flush, clean and disinfect the water distribution system and storage tanks **when necessary**.
- ☐☐☐- develop, and maintain for accuracy, a site plan showing the water source, a map of the water distribution system and sample location, disinfection process and all other appropriate appurtenances.
- ☐☐☐- collect or oversee the collection of water samples **as specified** by the Department of Environmental Protection.
- ☐☐☐- ensure that all samples are delivered to and analyzed by a Massachusetts certified laboratory.
- ☐☐☐- report all results to the Department of Environmental Protection **within the time frames specified**.
- ☐☐☐- conduct a sanitary survey of the public water system **as specified** by the Department of Environmental Protection.
- ☐☐☐- complete and submit to the Department of Environmental Protection the Annual Water Supply Statistical Report and all other required forms **in a timely manner**.
- ☐☐☐- notify the Department of Environmental Protection of a violation and issue public notices **when necessary**.
- ☐☐☐- review the sample monitoring schedule and locations **annually**.
- ☐☐☐- protect the water distribution system and storage facilities from corrosion effects.
- ☐☐☐- observe pump motors to detect unusual noises, vibrations, or excessive heat **routinely**.
- ☐☐☐- inspect, adjust and clean pump seals and packing glands and any mechanical seals **when necessary**.
- ☐☐☐- be present during water system repairs and maintenance and/or oversee the maintenance of the public water system conducted by other individuals such as staff or contractors.
- ☐☐☐- be present **within 24 hours** of fecal or second Total Coliform positive or other water system failures.
- ☐☐☐- record quantity of water pumped from source **monthly**.
- ☐☐☐- develop, implement and keep up to date a distribution protection cross connection control program, a preventive maintenance schedule, an operation and maintenance budget plan, an emergency response plan and safety program, and a wellhead protection program plan.
- ☐☐☐- ensure the accuracy of water meters and other flow measuring devices **as necessary**.
- ☐☐☐- delineate the wellhead protection zone.
- ☐☐☐- identify all potential sources of contamination within the wellhead protection zone.
- ☐☐☐- troubleshoot mechanical equipment, water quality and quantity problems and take corrective actions as necessary.
- ☐☐☐- keep abreast of changes in the drinking water regulations.
- ☐☐☐- attend training programs and workshops for certification renewal **when appropriate**.
- ☐☐☐- accompany regulatory agencies during on-site inspections.
- ☐☐☐- troubleshoot to locate the causes of water quality complaints and respond to consumer complaints in a **timely fashion**.
- ☐☐☐- discuss with the water consumers their concerns regarding the quality and quantity of drinking water they receive.
- ☐☐☐- develop and maintain a complaint log book
- ☐☐☐- keep accurate records and maintain a filing system for correspondence.
- ☐☐☐- develop, maintain and keep up to date a public water system standard operational and maintenance manual which contains at a minimum a) the most recent version of 310 CMR 22.00, Drinking Water Regulations; b) the Department's Guidelines and Policies for Public Water Systems; c) the Standard Monitoring Framework; and d) other pertinent documents.

ESTIMATED TIME: The annual estimated time required to perform all the duties and responsibilities listed above is approximately 180 to 360 hours. Exceptions to the staffing requirements may be allowed by the Department. Contact your regional office for further information.

Other PWS Responsible Party Duties:

PURPOSE: The duties and responsibilities listed in this document should act as guidelines for very small public water system owners to be used when they employ a contracted certified operator to be the person who is in responsible charge of said public water system. A comprehensive list of recommended duties and frequency is provided to give both the operator and public water system owner a better understanding not only of what is expected, but what is required to operate a public water system and stay in compliance with the Massachusetts Drinking Water Regulations. Operators and owners of public water systems should use this document as a guideline in determining operational requirements of the public water system. Although this is a comprehensive list of duties, it does not necessarily include everything that a certified operator is required to do in the performance of his or her duties.

Signature: _____ Title: _____

Print Name: _____ Date: _____

Signature: _____ Date _____

Affiliation/Company: _____ Certification Number: _____

Print Name: _____

[illegible]

Section 3:**Board of Certification of Operators of Drinking Water Supply Facilities**

The Board reviewed this agreement at its meeting held on _____, 19____ and confirms that the operator listed above is currently certified by the Board in the Grade specified.

Chairman's Signature: _____

Verified ☐ Refuted ☐

Comments: _____

Section 4: Department of Environmental Protection

Signature: _____ Title: _____

Print Name: _____ Date: _____

Approved ☐ Denied ☐

Comments: _____

This agreement is subject to the following conditions:

1. It is the responsibility of the public water system, acting through its highest level of management, to ensure that the contracted operator maintains a currently valid Massachusetts Drinking Water Operators Certification equal to or greater than the class of the system he or she is operating.
2. Said system recognizes its obligation and assumes the responsibility of notifying the Department of Environmental Protection, in writing, within 48 hours, of the loss of an operator or a change in certified operators.
3. Said system and certified operator shall notify all interested parties of the existence and responsibilities of this agreement.

INSTRUCTIONS:

The original form must be completed by the public water system and certified operator and submitted to the Board of Certification of Operators of Drinking Water Supply Facilities.

The Board will verify the information and return the signed form to the Department of Environmental Protection for review. A copy of the form will be placed in the Department's public water system file.

Once the Department grants approval, the original will be returned to the public water system. The public water system shall keep the original form on file, provide a copy to the operator, and send a copy to the Board of Certification of Operators of Drinking Water Supply Facilities, Division of Registration, 100 Cambridge Street, Room 1406, Boston, MA 02202, where it will be placed in the operator's file.

There are several versions of the form entitled, "Typical Duties and Responsibilities of a Public Water System Certified Operator." Complete only the form that corresponds to your public water system type. Disregard the others.

If you have any questions call the Department of Environmental Protection's regional office in your area. Springfield, 413-784-1100; Worcester, 508-792-7650; Wilmington, 978-661-7600; Lakeville, 508-946-2769.

Inspection Form: Small Public Water Systems

CERTIFIED OPERATOR INSPECTION FORM

If you are classified as a small water system that serves less than 3300 people, you must perform regular inspections of your system to ensure it is functioning properly. You must also keep records and inspect the Zone I and protection area around your source. This form should be completed by a certified operator and kept with your records. DEP staff will ask to see these forms during routine inspections and sanitary surveys.

Date of Inspection: _____ **Type of System:** COM / NTNC / TNC **Class:** VSS / DI / DII

PWS Name: _____ **PWS ID #:** _____

Operator: _____ **Grade ID #:** _____

This inspection must be performed by a certified operator on a routine basis

Owner/Responsible Party: _____ **Present at Inspection:** Yes No

Designated Person at Inspection/Position: _____

SYSTEM COMPONENTS	COMMENTS
<input type="checkbox"/> Wellhead - Zone 1	
<input type="checkbox"/> Storage Facilities	
<input type="checkbox"/> Chemical Addition System	
<input type="checkbox"/> Distribution Piping	
SYSTEM MAINTENANCE	COMMENTS
<input type="checkbox"/> Review Maintenance Schedule	
<input type="checkbox"/> Pumps	
<input type="checkbox"/> Calibrating Instrumentation	
RECORD KEEPING	COMMENTS
<input type="checkbox"/> Discuss DEP Correspondence with Owner	
<input type="checkbox"/> Statistical Reports	
<input type="checkbox"/> WQ Waiver Applications	
<input type="checkbox"/> WQ Sample Schedules	
<input type="checkbox"/> Other	
<input type="checkbox"/> Record Flow Meter Readings	
<input type="checkbox"/> Discuss Drinking Water Regulations with Owner	
<input type="checkbox"/> Daily Chemical Residuals	

Signature of Operator Performing Inspection: _____

Date: _____



Commonwealth of Massachusetts - Division of Registration
Board of Certification of Operators of Drinking Water Supply Facilities

Application for Temporary Emergency Certification

Leverett Saltonstall Building, 100 Cambridge Street - Room 1406, Boston MA 02202

A Applicant Information

Instructions:

1. If you are assisting a current operator of your system to meet certification requirements, you must contact NAI at (508) 624-0826 to register for the operator examination before applying for temporary emergency certification.

2. Read all instructions and questions before filling out this application.

3. Answer all questions on this form. If a question is not applicable, draw a line in the space or write NA. *Incomplete applications will be returned.*

4. Enclose a check or money order for the amount of \$10.00, payable to the Commonwealth of Massachusetts.

5. Send your complete application package to the address at the top of this page.

Name of Public Water System

PWS ID#

Classification of System

Contact Person

Address

Work Telephone #

Home Telephone #

City/Town

Zip Code

B Temporary Emergency Certification Grade Information

Grade of temporary emergency certificate applying for (check one):

Note: Temporary emergency certificates are valid for a period of six months from the date of approval by the Board and cannot be renewed.

1. ☐ VSS (very small system)
2. ☐ VND (vending machine) ☐ VND-1D ☐ VND-2D
☐ VND-1T ☐ VND-2T ☐ VND-3T ☐ VND-4T
3. ☐ Distribution ☐ 1D ☐ 2D ☐ 3D ☐ 4D
4. ☐ Treatment ☐ 1T ☐ 2T ☐ 3T ☐ 4T

C Staffing Requirement Information

1. Why is temporary emergency certification necessary for your public water system?

2. Does your public water system plan to hire an operator on a contract basis? ☐ Yes ☐ No

b. Date on which examination will be taken: _____

3. Do you plan to become a certified operator? ☐ Yes ☐ No

- c. Is the operator enrolled in an examination preparation training course? ☐ Yes ☐ No

4. Does your public water system plan to assist a current operator of your system to meet certification requirements? ☐ Yes ☐ No

If yes, please list the name(s) of the course(s) and the sponsoring organization(s):

5. If you answered yes to #3 and #4, please answer the following:

- a. Grade of examination operator will be taking:

- ☐ VSS (very small system)
☐ VND (vending machine)
☐ Distribution ☐ 1D ☐ 2D ☐ 3D ☐ 4D
☐ Treatment ☐ 1T ☐ 2T ☐ 3T ☐ 4T

6. Under what capacity would this operator function?
☐ Primary operator ☐ Secondary operator

D Experience

In the following spaces, please furnish information about the operator designated to operate the system under the temporary emergency certification:

Name

Address

Title

City/Town

Zip Code

Date This Position Began

Work Telephone #

Home Telephone #

Is this person presently an operator of a PWS, as defined in 236 CMR 2.03? ☐ Yes ☐ No

Supervisor

Title

Grade(s)

How long has this person worked as an operator of said system?

Supervisor's Telephone #

Years

Months

E Affidavit

"I do solemnly swear (affirm) that I am the person responsible for said public water supply facility and that I have read the contents hereof, and to the best of my knowledge and belief that all statements and answers are true in substance and effect and are made in good faith. I understand that misstatement of material facts may result in forfeiture of all rights to certification as a drinking water operator in Massachusetts."

Signature of Responsible Party

Date

Appendix H

Forms

Please Post

Public Notification
Monitoring and Reporting Violations

Town _____
PWS Name _____
PWS ID # _____

This notification is to inform the customers of the _____
PWS Name
that the _____ failed to monitor and/or report the test results
PWS Name
for regulated contaminant, _____, during _____
Name of Contaminant Sample Period
as required by the Department of Environmental Protection and/or the U.S. Environmental
Protection Agency (EPA). This failure to monitor and/or report constitutes a violation of
Massachusetts Drinking Water Regulations, 310 CMR 22.15 and/or 22.16, and requires
public notification by the public water supplier. The U.S. EPA sets drinking water standards
and has determined that the regulated contaminant may pose a health concern at excessive
levels of exposure.

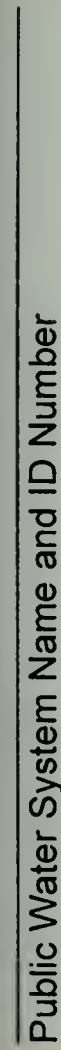
The _____ has taken the following steps to correct the failure to
PWS Name
monitor and/or report:

Questions regarding this notice should be directed to: _____
Owner or
_____ at _____
Operator Phone Number

_____ Date Posted _____ Date

This notice must be posted for three weeks.

Send a copy of this notice to your regional DEP Office.



COMPLAINT LOG

[illegible]

USE THIS LOG to keep a record of complaints from your customers. If you cannot resolve a problem, contact your DEP Regional Office. DEP may request a copy of your complaint log at any time.

Source Protection Sign Order Form

Northeast Rural Water Association

Please make check or money order payable to NeRWA
Send to 6 Prim Road, PO Box 622, Colchester, VT 05446
Call 802-660-4988 with any questions.
Fax 802-660-4990

All signs are .12 gauge aluminum

		Quantity	
NO TRESPASSING	11.25" X 7.5" (Black with Blue)	<input type="text"/>	@ \$2.50 = <input type="text"/>
DRINKING WATER SUPPLY AREA	11.25" x 11.25" (Blue)	<input type="text"/>	@ \$2.50 = <input type="text"/>
DRINKING WATER SUPPLY AREA	18" x 24" (Blue)	<input type="text"/>	@ \$10.00 = <input type="text"/>

Shipping and Handling Charge: (not for 18 X 24 signs)

Order 1 - 14 Add \$3.00

Order 15 - 24 Add \$4.00

Order 25 - 31 Add \$5.00

Order 32 - 50 Add \$8.00

Orders over 50 call first

TOTAL

Please Ship To:

Name Phone
Address
City State Zip

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

RESEARCH REPORT

BY

DR. J. H. COOPER

AND

DR. R. M. COOPER

CHICAGO, ILLINOIS

1955

CHICAGO, ILLINOIS

Appendix I

Drinking Water Regulations



Department of Environmental Protection

Drinking Water Program

**310 CMR 22.00
Drinking Water Regulations**

Revised March 21, 1997

One Winter Street • Boston, Massachusetts 02108 • 617-292-5770



310 CMR: DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 22.00 DRINKING WATER

Section

- 22.01: Purpose and Authority
- 22.02: Definitions
- 22.03: Compliance
- 22.04: Construction, Operation and Maintenance of Public Water Systems
- 22.05: Maximum Microbiological Contaminant Levels, Monitoring Requirements and Analytical Methods
- 22.06: Inorganic Chemical Contaminant Levels, Monitoring Requirements and Analytical Methods
- 22.06A: Special Monitoring for Sodium, Reporting and Analytical Methods and Frequency
- 22.06B*: Control of Lead and Copper in Drinking Water
- 22.06C*: Fluoride Secondary Maximum Contaminant Level and Public Notification
- 22.07*: Trihalomethanes Maximum Contaminant Levels, Monitoring Requirements and Analytical Methods
- 22.07A*: Synthetic Organic Maximum Chemical Contaminant Levels, Monitoring Requirements and Analytical Methods
- 22.07B*: Volatile Organic Maximum Chemical Contaminant Levels, Monitoring Requirements and Analytical Methods
- 22.07C*: Unregulated Special Monitoring for Inorganic and Organic Chemicals, Monitoring Requirements and Analytical Methods
- 22.08*: Turbidity Maximum Contaminant Levels, Monitoring Requirements and Analytical Methods for Unfiltered Systems and for Filtered Systems not in Compliance with 310 CMR 22.20A
- 22.09*: Radionuclide Maximum Contaminant Levels, Monitoring Requirements and Analytical Methods
- 22.10*: Alternative Analytical Methods
- 22.11A: Laboratory Certification
- 22.11B: Public Water Systems Certified Operator Staffing Requirements
- 22.12: Consecutive Public Water Systems
- 22.13: Variances
- 22.14: Exemptions
- 22.15: General Reporting Requirements
- 22.16: Public Notification Requirements
- 22.17: Record Maintenance
- 22.18: Right of Entry
- 22.19: Distribution System Requirements
- 22.20A: Surface Water Treatment Rule
- 22.20B: Surface Water Supply Protection
- 22.21: Ground Water Supply Protection
- 22.22: Cross Connections Distribution System Protection
- 22.23: Use of Non-Centralized Treatment Devices and Bottled Water
- 22.24: Sale, Transfer of Property Interest, or Change in Use of Water Supply Land
- 22.25: Abandonment of Water Supply Sources
- 22.26: Severability

* These sections do not apply to Transient Noncommunity systems

22.01: Purpose and Authority

(1) 310 CMR 22.00 is intended to promote the public health and general welfare by ensuring that public water systems in Massachusetts provide to the users thereof water that is safe, fit and pure to drink. 310 CMR 22.00 is promulgated pursuant to the authority conferred by M.G.L. c. 21A, § 2(28), and M.G.L. c. 111, §160. Pursuant to M.G.L. c. 30A, §§ 1(5), 2 and 3, 310 CMR 22.00 is promulgated to set forth those standards and requirements of general application and future effect which shall be used to implement, interpret and enforce M.G.L. c. 40, §§ 15B, 38, 39B, 39C, 40, 41, and 41A; M.G.L. c. 111, §§ 2C, 5E, 5F, 5G, 17, 143, 159, 160A, 160B, 162 and 165; M.G.L. c. 114, §§ 35 and 36; M.G.L. c. 140, §§ 32B and 32H; and M.G.L. c. 165, §§ 4B and 6.

- (a) The Department affirms its authority to determine compliance or initiate enforcement actions related to 310 CMR 22.00 based upon analytical results and other information compiled by its sanctioned representatives and agencies.
- (b) 310 CMR 22.22 is promulgated pursuant to the authority conferred by M.G.L. c. 111, §§ 160 and 160A.

22.01: continued

(2) Effective Dates.

- (a) 310 CMR 22.00 shall take effect on June 24, 1977. Rules and Regulations For the Purpose of Preventing The Pollution And Securing The Sanitary Protection of Certain Waters Used As Sources of Public Water Supply, approved and adopted by the Department of Public Health on October 11, 1960 and filed with the Secretary of the Commonwealth on June 1, 1961, are repealed as of the effective date of 310 CMR 22.00.
- (b) The effective date for 310 CMR 22.06, 22.07, 22.07A is January 1, 1993.
- (c) The effective date for 310 CMR 22.07B(1)(a)(1) through (a)(8) is January 9, 1989.
- (d) The effective date for 310 CMR 22.07B(1)(a)(9) through (a)(18) and of 310 CMR 22.07A(1)(a)(1) through (c)(18) is July 30, 1992.
- (e) The maximum contaminant level for lead shall remain effective until December 7, 1992; the maximum contaminant level for barium shall remain effective until January 1, 1993.
- (f) The effective date for 310 CMR 22.06(2)(a) is October 2, 1987 and for 310 CMR 22.06(2)(b) through (k) is July 30, 1992.
- (g) 310 CMR 22.05 became effective January 1, 1991.
- (h) The effective date for 310 CMR 22.06(1)(l) through (p), 22.07A(1)(t) through (hh) and 22.07B(1)(s) through (v) is January 17, 1994
- (i) The effective date for 310 CMR 22.11B is July 1, 1995.

22.02: Definitions

- (1) As used in 310 CMR 22.00, the following terms shall have the following meanings:

Abandoned Source means a source that is physically disconnected from a public water system and is no longer maintained as an active, inactive, or emergency source. Abandoned source(s) can not be used as a public water system source. A source may only be abandoned pursuant to 310 CMR 22.25.

Action level is the concentration of lead or copper in water specified in 310 CMR 22.06B(1)(c) which determines, in some cases, the treatment requirements contained in 310 CMR 22.06B that a water system is required to complete.

Active Source means an approved source(s), monitored and maintained to meet 310 CMR 22.00 and used for primary or backup purposes to meet consumer demands as necessary.

Administrator means the Administrator of the Agency.

Agency means the United States Environmental Protection Agency.

Approved Source means a water supply source approved by the Department for drinking water purposes pursuant to 310 CMR 22.03(1).

Bank means the portion of the land surface which normally abuts and confines a water body; it lies between a water body and a bordering vegetated wetland and adjacent flood plain, or in the absence of these, it lies between a water body and an upland; the upper boundary of a bank is the first observable break in the slope or the mean annual flood level, whichever is lower; the lower boundary of a bank is the mean annual low flow level.

Best Available Technology or "BAT" means the best technology treatment techniques, or other means which the EPA or Department finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration).

Certified Operator means an operator who has received a certified of competency issued by the Board of Certification of Operators of Drinking Water Supply Facilities in accordance with 236 CMR 2.00, 3.00, 4.00, and 5.00 and currently maintains a valid license.

Coagulation means a process using coagulant chemicals and mixing by which colloidal and suspended materials are destabilized and agglomerated into flocs.

22.02: continued

Commissioner means the Commissioner of the Department of Environmental Protection

Compliance Cycle means the nine-year (calendar year) cycle during which public water systems must monitor. Each compliance cycle consists of three-year compliance periods. The first calendar year cycle begins January 1, 1993 and ends December 31, 2001; the second begins January 1, 2002 and ends December 31, 2010; the third begins January 1, 2011 and ends December 31, 2019.

Compliance Period means a three-year (calendar year) period within a compliance cycle. Each compliance cycle has three-year compliance periods. Within the first compliance cycle, the first compliance period runs from January 1, 1993 to December 31, 1995; the second from January 1, 1996 to December 31, 1998; the third from January 1, 1999 to December 31, 2001.

Confluent growth means a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete.

Contaminant means any physical, chemical, biological or radiological substance or matter in water.

Conventional Filtration Treatment means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal.

Corrosion inhibitor means a substance capable of reducing the corrosivity of water toward metal plumbing materials, especially lead and copper, by forming a protective film on the interior surface of those materials.

CT or CT_{calc} is the product of "residual disinfectant concentration" ("C") in mg/l determined before or at the first customer, and the corresponding "disinfectant contact time" ("T") in minutes, i.e., "C" x "T". If a public water system applies disinfectants at more than one point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or "total inactivation ratio." In determining the total inactivation ratio, the public water system must determine the residual disinfectant concentration of each disinfection sequence and corresponding contact time before any subsequent disinfection application point(s). "CT_{99.9}" is the CT value required for 99.9% (3-log) inactivation of *Giardia lamblia* cysts. CT_{99.9} for a variety of disinfectants and conditions appear in Tables (1.1-22.20A through 1.6-22.20A, 2.1-22.20A and 3.1-22.20A) in 310 CMR 22.20A(5)(b)3.

$$\frac{CT_{calc}}{CT_{99.9}}$$

is the inactivation ratio. The sum of the inactivation ratios, or total inactivation ratio shown as

$$\frac{(CT_{calc})}{(CT_{99.9})}$$

is calculated by adding together the inactivation ratio for each disinfection sequence. A total inactivation ratio equal to or greater than 1.0 is assumed to provide a 3-log inactivation of *Giardia lamblia* cysts.

Department means the Department of Environmental Protection of the Commonwealth of Massachusetts.

Diatomaceous Earth Filtration means a process resulting in substantial particulate removal in which (1) a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and (2) while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.

Direct Filtration means a series of processes including coagulation and filtration but excluding sedimentation resulting in substantial particulate removal.

22.02: continued

Direct Responsible Charge means accountability for and performance of active, daily on-site operation of the facility or system, or a major segment of the facility or system where shift operation is not required. Where shift operation is required "Direct Responsible Charge" shall mean accountability for and performance of active, daily on-site operation of an operating shift, or a major segment of the operation of the facility or system.

Disinfectant means any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone, which is added to water in any part of the treatment or distribution process, and which is intended to kill or inactivate pathogenic microorganisms.

Disinfectant Contact Time ("T" in CT calculations) means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration ("C") is measured. Where only one "C" is measured, "T" is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or at where residual disinfectant concentration ("C") is measured. Where more than one "C" is measured, "T" is (a) for the first measurement of "C", the time in minutes that it takes for water to move from the first or only point of disinfectant application to a point before or at the point where the first "C" is measured and (b) for subsequent measurements of "C", the time in minutes that it takes for water to move from the previous "C" measurement point to the "C" measurement point for which the particular "T" is being calculated. Disinfectant contact time in pipelines must be calculated based on "plug flow" by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. Disinfectant contact time within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

Disinfection means a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

Distribution System means a system of conduits (laterals, distributors, pipes, mains, and their appurtenances, and in some cases includes interior plumbing) by which potable water is distributed to consumers. For the purpose of 310 CMR 22.00, the distribution system may include the source booster pumping stations, storage tanks and reservoirs, and chlorination and/or disinfection facilities.

Division means the Division of Water Supply, one of the Divisions comprising the Department of Environmental Protection.

Domestic or other non-distribution system plumbing problem means a coliform contamination problem in a public water system with more than one service connection that is limited to the specific service connection from which the coliform-positive sample was taken.

DoseEquivalent means the product of the absorbed dose from ionizing radiation and such factors as account for differences in biological effectiveness due to the type of radiation and its distribution in the body as specified by the International Commission on Radiological Units and Measurements (ICRU).

Effective corrosion inhibitor residual, for the purpose of 310 CMR 22.06B only, means a concentration sufficient to form a passivating film on the interior walls of a pipe.

Emergency source means any source of water used to supplement or temporarily replace a public water system's active or inactive source(s) when water of sufficient quality or quantity is not available. An emergency source may be placed on-line only after the Department's approval pursuant to a declaration of a state of water emergency under M.G.L. c. 21G, § 15 through 17 or as a requirement of a Department administrative order.

Expand means to increase the yield of a well or wellfield above the approved pumping rate.

Filtration means a process for removing particulate matter from water by passage through porous media.

22.02: continued

First draw sample means a one-liter sample of tap water, collected in accordance with 310 CMR 22.06B(1)(a)2. that has been standing in plumbing pipes at least six hours and is collected without flushing the tap.

Flocculation means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.

Gross alpha particle activity means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

Gross beta particle activity means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

Groundwater means all water that exists beneath the land surface in soils or geologic formations, specifically that part of the subsurface water in the saturated zone.

Ground water under the direct influence of surface water means any water beneath the surface of the ground with (1) significant occurrence of insects or other microorganisms, algae, or large-diameter pathogens such as *Giardia lamblia*, or (2) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence must be determined for individual sources in accordance with criteria established by the Department. The Department's determination of direct influence may be based on site-specific measurements of water quality and/or documentation of well construction characteristics and geology with field evaluation.

Guidelines and Policies for Public Water Systems means the Division of Water Supply's document titled "Guidelines and Policies for Public Water Systems," as amended, utilized by the Division as a guidance document. Copies of the "Guidelines and Policies for Public Water Systems" are available for a nominal fee from the State Bookstore, State House, Room 116, Boston, Massachusetts and 21 Elm Street, Springfield, Massachusetts.

Halogen means one of the chemical elements chlorine, bromine, or iodine.

Home water treatment device means any apparatus, appliance, instrument, or product designed or used in conjunction with residential plumbing systems or systems providing water in any building or structure for human consumption or use; including but not limited to, apparatus, appliances, instruments, or products using filtration, distillation, absorption, ion exchange, reverse osmosis, or other treatment processes or technologies which alter the properties of water. This definition includes point-of-entry and point-of-use devices.

Inactive Source means an approved source(s) which is expected to be off-line for at least one year (12 months). A source may be deemed inactive only upon written approval of the Department. An inactive source may not return to active status without written approval from the Department. Monitoring as specified at 310 CMR 22.00, is not required during the time that the source is inactive, unless otherwise specified by the Department.

Initial Compliance Period means the first full three-year compliance period which begins at least 18 months after promulgation of the federal regulations (January 30, 1991), except for contaminants listed at 310 CMR 22.06(2)(l) through (p), 310 CMR 22.07A(1)(t) through (hh) and 310 CMR 22.07B (i) through (u), for which the initial compliance period means that first full three-year compliance period (January 1993-December 1995), after promulgation of the federal regulations (July 17, 1992), for systems with 150 or more service connections and first full three-year compliance period (January 1996-December 1998), after the effective date of the regulations for systems having fewer than 150 service connections.

Interim Wellhead Protection Area (IWPA) For public water systems using wells or wellfields that lack a Department approved Zone II, the Department will apply an interim wellhead protection area. This interim wellhead protection area shall be a one-half mile radius measured

22.02: continued

from the well or wellfield for sources whose approved pumping rate is 100,000 gpd or greater. For wells or wellfields that pump less than 100,000 gpd, the IWPA radius is proportional to the approved pumping rate which may be calculated according to the following equation: IWPA radius in feet = $(32 \times \text{pumping rate in gallons per minute}) + 400$. A default IWPA radius or an IWPA radius otherwise computed and determined by the Department shall be applied to transient non-community (TNC) and non-transient non-community (NTNC) wells when there is no metered rate of withdrawal or no approved pumping rate. The default IWPA radius shall be 500 feet for TNC wells and 750 feet for NTNC wells.

Laboratory Analyst means a person who is qualified to perform tests in specified disciplines or categories.

Laboratory Director means the person who has administrative and legal responsibility for the operation of the laboratory.

Laboratory Supervisor/Consultant means a person with management and technical responsibility who exercises supervision over technical personnel, evaluates the quality of analytical methods, performs tests requiring special scientific skills and is responsible for the accuracy and reporting of results.

Large Water System means a water system that serves more than 50,000 persons.

Lead Service Line means a service line made of lead which connects the water main to the building inlet and any lead pigtail, gooseneck or other fitting which is connected to such lead line.

Legionella means a genus of bacteria, some species of which have caused a type of pneumonia called Legionnaires Disease.

Man-made beta particle and photon emitters means all radionuclides emitting beta particles and/or photons listed in Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69, except the daughter products of thorium-232, uranium-235 and uranium-238.

Maximum Contaminant Level means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

Maximum Total Trihalomethane Potential means the maximum concentration of total trihalomethanes produced in a given water containing a disinfectant residual after seven days at a temperature of 25°C or above.

Medium-size Water System means a water system that serves greater than 3,300 and less than or equal to 50,000 persons.

Near the first service connection means at one of the 20% of all service connections in the entire system that are nearest the water supply treatment facility, as measured by water transport time within the distribution system.

New Source means any existing, proposed, or expanded use of a water source in a public water system which has not met the requirements of guidelines and regulations utilized by the Division of Water Supply.

New Source Approval Process means the step by step process utilized by the Department's Division of Water Supply culminating in the development of water for a public water system.

Nonzoning controls means by-laws, ordinances, rules and regulations, other than zoning controls, adopted in accordance with the constitutional and statutory powers of cities and towns to protect the health, safety and general welfare of their present and future inhabitants.

22.02: continued

On-line means a well, wellfield or surface water source from which water currently is being pumped or drawn for use in a public water system.

Optimal Corrosion Control Treatment means, for the purpose of 310 CMR 22.06B only, the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while insuring that the treatment does not cause the water system to violate any national primary drinking water regulations.

Performance Evaluation Sample means a reference sample provided to a laboratory for the purpose of demonstrating that the laboratory can successfully analyze the sample within limits of performance set by the Department.

Person means an individual, corporation, company, association, trust, partnership, the Commonwealth, a municipality, district or other subdivision or body politic of the Commonwealth, any department, agency, or instrumentality of the United States, except that nothing herein shall be construed to refer to or include any American Indian tribe, or the United States Secretary of the Interior in his capacity as trustee of Indian lands.

Picocurie (pCi) means that quantity of radioactive material producing 2.22 nuclear transformations per minute.

Point of disinfectant application is the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface water runoff.

Point-of-entry treatment device means a device installed to treat the water entering a house or building or portion of such for the purpose of reducing contaminants in the water distributed throughout the house or building or portion of such.

Point-of-use treatment device means a treatment device installed on a single faucet or spigot used for the purpose of reducing contaminants in drinking water at that one faucet or spigot.

Primary Operator means a person who is certified by the Board of Certification of Drinking Water Supply Facilities and has a grade certificate equal to the class of the corresponding facility at which he or she is employed. The Primary Operator shall be the individual who has direct responsibility for charge of the operation of a facility such as the superintendent or chief plant operator who has active field supervision of the operation of the facility or who is required in the performance of their normal duties to give responsible, technical advice and supervision of the technical aspects rather than only general administrative supervision of the treatment and/or distribution of the water supply and spends their working hours at the treatment facility or performing distribution system duties and is knowledgeable of the Massachusetts Drinking Water Regulations, guidelines and policies. The Primary Operator of the facility shall hold a "Full Operator" status and cannot hold an "Operator-in-Training" certificate as defined in 236 CMR 4.05.

Public Water System means a system for the provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year. Such term includes (1) any collection, treatment, storage, and distribution facilities under control of the operator of such a system and used primarily in connection with such system, and (2) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. A public water system is either a "community water system" or a "non-community water system".

(a) Community water system means a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

(b) Non-community water system means a public water system that is not a community water system.

22.02: continued

1. Non-transient non-community water system or "NTNC" means a public water system that is not a community water system and that regularly serves at least 25 of the same persons or more approximately four or more hours per day, four or more days per week, more than six months or 180 days per year, such as a workplace providing water to its employees.

2. Transient non-community water system or TNC means a public water system that is not a community water system or a non-transient non-community water system but is a public water system which serves water to 25 different persons at least 60 days of the year. Some examples of these types of systems are: restaurants, motels, camp grounds, parks, golf courses, ski areas and community centers.

Reliably and Consistently below the MCL means that though a system detects contaminants in its water supply, it has sufficient knowledge of the source or extent of the contamination to predict that the MCL would not be exceeded in the future. Wide variations in an analytical results or an analytical results which is close to the MCL are examples of situations where systems would not meet the "reliably and consistently" test.

Rem means the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millirem (mrem)" is 1/1000 of a rem.

Repeat Compliance Period means any subsequent compliance period after the initial compliance period.

Replace means to substitute a new well for an approved well where the proposed new well will be situated within fifty feet of the existing well and have a pumping rate equal to or less than that of the existing well.

Residual Disinfectant Concentration ("C" in CT calculations) means the concentration of disinfectant measured in mg/l in a representative sample of water.

River Source means a drinking water source with a direct intake located at any river or stream which is designated as a drinking water source in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00. Protected Zones A, B, and C, as defined herein, do not apply to river sources designated as Class B under 314 CMR 4.00.

Sampling Point means the entry point to the distribution system which represents each source after treatment.

Sanitary Survey means an on site review of the water sources, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

Saturated Zone means a zone in which all voids, large and small, are filled with water under pressure, equal to or greater than atmospheric pressure.

Secondary Maximum Contaminant Level means a non-enforceable standard not based on potential health effects, which is derived solely to protect against expected aesthetic effects. Suppliers of water are encouraged to meet secondary maximum contaminant levels to discourage persons served by the public water system from discontinuing their use of drinking water from public water systems.

Secondary Operator means a person who is certified by the Board of Certification of Operators of Drinking Water Supply Facilities and has an operator's license not less than one grade lower than the classification of the facility at which they are employed. For Class III treatment facilities or higher, the Secondary Operator must also have at least six months working experience in a Class II treatment facility or higher. A Secondary Operator shall be an individual who spends their working hours at the treatment facility as the shift supervisor or performs distribution system duties as a foreman or assistant superintendent and is knowledgeable of the Massachusetts Drinking Water Regulations, guidelines and policies. A Secondary Operator shall

22.02: continued

be in direct responsible charge during periods of time when the Primary Operator is temporarily absent or is not scheduled for duty. The Secondary Operator may hold an Operator-in-Training certificate as defined in 236 CMR 1.00 through 5.00.

Sedimentation means a process for removal of solids before filtration by gravity or separation.

Service line sample means a one-liter sample of water, collected in accordance with 310 CMR 22.06B(7) has been standing for at least six hours in a service line.

Single family structure, for the purpose of 310 CMR 22.06B only, means a building constructed as a single-family residence that is currently used as either a residence or a place of business.

Slow Sand Filtration means a process involving passage of raw water through a bed of sand at low velocity (generally less than 0.4 m/h) resulting in substantial particulate removal by physical and biological mechanisms.

Small water system means a water system that serves 3,300 persons or fewer.

Standard Sample means the aliquot of finished drinking water that is examined for the presence of coliform bacteria.

Substantial modification means any deviation from approved plans or specifications affecting capacity, hydraulic conditions, operating units, the functioning of water treatment processes or systems, or the quality of water delivered to consumers.

Supplier of water means any person who owns or operates a public water system.

Surface water means all water which is open to the atmosphere and subject to surface runoff.

Surface Water Source means any lake, pond, reservoir, river, stream or impoundment designated as a public water supply in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00.

System with a single service connection means a system which supplies drinking water to consumers via a single service line.

Too numerous to count means that the total number of bacterial colonies exceeds 200 on a 47-mm diameter membrane filter used for coliform detection.

Total-Trihalomethanes means the sum, rounded to two significant figures, of the concentrations in milligrams per liter of the trihalomethane compounds, trichloromethane (chloroform), bromodichloromethane, dibromochloromethane, and tribromomethane (bromoform).

Tributary means any body of running, or intermittently running, water which moves in a definite channel, naturally or artificially created, in the ground due to a hydraulic gradient, and which ultimately flows into a Class A surface water source, as defined in 314 CMR 4.05(3)(a).

Trihalomethane means one of the family of organic compounds, named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

Virus means a virus of fecal origin which is infectious to humans by waterborne transmission.

Waterborne disease outbreak means the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the Department in conjunction with the Massachusetts Department of Public Health.

22.02: continued

Watershed means the area contained within geomorphic or topographic boundaries of higher elevations which cause surface water and/or groundwater to drain or flow to lower elevations into water used as a public water system source.

Zoning controls means by-laws and ordinances adopted by cities and towns in accordance with M.G.L. c. 40A.

Zone A means

- (a) the land area between the surface water source and the upper boundary of the bank;
- (b) the land area within a 400 foot lateral distance from the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a); and
- (c) the land area within a 200 foot lateral distance from the upper boundary of the bank of a tributary or associated surface water body.

Zone B means the land area within one-half mile of the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a), or edge of watershed, whichever is less. However, Zone B shall always include the land area within a 400 foot lateral distance from the upper boundary of the bank of the Class A surface water source.

Zone C means the land area not designated as Zone A or B within the watershed of a Class A surface water source as defined at 314 CMR 4.05(3)(a).

Zone I means the protective radius required around a public water supply well or wellfield. For public water system wells with approved yields of 100,000 gpd or greater, the protective radius is 400 feet. Tubular wellfields require a 250 foot protective radius. Protective radii for all other public water system wells are determined by the following equation: Zone I radius in feet = $(150 \times \log \text{ of pumping rate in gpd}) - 350$. This equation is equivalent to the chart in the Division's Water Supply Guidelines. A default Zone I radius or a Zone I radius otherwise computed and determined by the Department shall be applied to transient non-community (TNC) and non-transient non-community (NTNC) wells when there is no metered rate of withdrawal or no approved pumping rate. The default Zone I radius shall be 100 feet for TNC wells and 250 feet for NTNC wells.

Zone II means that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). It is bounded by the groundwater divides which result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone II shall extend upgradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock, or a recharge boundary).

Zone III means that land area beyond the area of Zone II from which surface water and groundwater drain into Zone II. The surface drainage area as determined by topography is commonly coincident with the groundwater drainage area and will be used to delineate Zone III. In some locations, where surface and groundwater drainage are not coincident, Zone III shall consist of both the surface drainage and the groundwater drainage areas.

(2) Definitions as Related to Cross Connections. As used in 310 CMR 22.22, unless the context indicates otherwise, the following words shall have the following meanings:

Air Gap Separation means the method of preventing backflow through the use of an unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the receptacle.

Approved Backflow Prevention Device or Device means a method to prevent backflow approved by the Department for use in Massachusetts.

22.02: continued

Approved Examiner means an individual authorized in writing by the Department to administer written and practical certification examinations at a recognized training institution.

Atmospheric Vacuum Breaker means an approved backflow device used to prevent back siphonage which is not designed for use under static line pressure.

Audit means a review of a Public Water System's implementation of its cross connection program to evaluate its effectiveness in distributing safe drinking water.

Back Pressure means pressure created by mechanical means or other means which causes water or other liquids or substances to flow or move in a direction opposite to that which is intended.

Back Siphonage means a form of backflow due to reduced or sub-atmospheric pressure within a water system.

Backflow means the flow of water or other liquids, mixtures or substances into the distribution pipes of a potable water supply from any source other than the intended source.

Backflow Preventer with Intermediate Atmospheric Vent means a device having two independently operating check valves separated by an intermediate chamber with a means for automatically venting it to the atmosphere, in which the check valves are force loaded to a normally closed position and the venting means is forced loaded to a normally open position.

Barometric Loop means a loop of pipe rising at least 35 feet, at its topmost point, above the highest fixture it supplies.

Certification Examination means an examination approved by the Department for the purpose of testing competency in all areas of cross connection control and backflow prevention device testing.

Certified Backflow Prevention Device Tester means an individual who holds a valid Massachusetts Backflow Prevention Device Tester's Certificate issued by the Department.

Contaminant means any physical, chemical, biological or radiological substance or matter in water.

Cross Connection means any actual or potential connection between a distribution pipe of potable water from a public water system and any waste pipe, soil pipe, sewer, drain, or other unapproved source. Without limiting the generality of the foregoing, the term "cross connection" shall also include any by-pass arrangements, jumper connections, removal section, swivel or changeover connection and other temporary or permanent connection through which backflow can or may occur.

Cross Connection Program Plan means a plan submitted to the Department by the water supplier describing the current and proposed cross connection program and including information on staffing, training, testing, surveying, fee structure, etc.

Cross Connection Violation Form means a violation form designated by the Department, which is sent to the owner by the water supplier with copies to the Department, plumbing inspectors and Board of Health delineating cross connection violations found on the owner's premises and a procedure for corrective action.

Department's Designee or Designee means any water supplier to whom, upon written request of said water supplier, the Department delegates any portion of its authority to act under 310 CMR 22.22.

22.02: continued

Design Data Sheet means a report form, designated by the Department, which is to be submitted to the Department or its Designee along with plans for each installation of a reduced pressure backflow preventer or double check valve assembly, or for each change to any such device already installed, describing and showing the details of the specific installation.

Double Check Valve Assembly means a backflow prevention device which incorporates an assembly of check valves, with shut-off valves at each end and appurtenances for testing.

Health Hazard means an actual or potential threat of contamination to the potable water in a public water system which, in the opinion of the Department or its Designee would endanger health.

In-Plant Protection means the location of approved backflow prevention devices in a manner which provides simultaneous protection of the public water system and the potable water system within the premises.

Inspection means an on-site inspection and survey by a qualified individual to determine the existence and location of cross connections and/or the physical examination and testing of an installed backflow prevention device to verify that the backflow prevention device is functioning properly.

Inspection and Maintenance Report Form means a report form, designated by the Department, which is to be used by certified testers to record all pertinent testing information.

Owner means any person maintaining a cross connection installation or owning or occupying premises on which cross connections can or do exist.

Owner's Agent means any person or body designated by the owner to act as his or her representative.

Permit Application Form means an application form designated by the Department, which must be submitted to the Department accompanied by the appropriate annual permit fee and if required, the annual owner Inspection and Maintenance Report Form, signed and dated by a certified tester.

Potable Water means water from any source which has been approved by the Department for human consumption.

Pressure Vacuum Breaker means an approved backflow prevention device designed to prevent only back siphonage and which is designed for use under static line pressure.

Reduced Pressure Backflow Preventer means an approved backflow prevention device incorporating (1) two or more check valves, (2) an automatically operating differential relief valve located between the two checks, (3) two shut-off valves, and (4) necessary appurtenances for testing; and which is designed to operate so that (a) the pressure in the zone between the two check valves is maintained at a value less than the pressure on the public water system side of the device and (b) at cessation of normal flow, the pressure in the zone between the two check valves is maintained at a value less than the pressure on the public water system side of the device, and (c) in the case of leakage of either check valve, the differential relief valve shall operate to maintain reduced pressure in the zone by discharging to the atmosphere.

Reviewing Authority means the Department, its Designee, or the local plumbing inspector, authorized by M.G.L. c. 142 and licensed by the Board of State Examiners of Plumbers and Gas Fitters, whichever is responsible for the review and approval of the installation of an approved backflow prevention device.

Supplier of Public Water means any person who owns or operates a public water supply system.

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Unapproved Source means the source or distribution system for any water or other liquid or substance which has not been approved by the Department as being of safe and sanitary quality for human consumption, including but not limited to any waste pipe, soil pipe, sewer, drain, or non-acceptable potable water system material.

22.03: Compliance

(1) No source of water used by a public water system, no system of water supply used by a public water system, and no treatment facilities or treatment works used by a public water system shall be deemed by the Department to be safe, fit, or pure, or in any other way approved, and shall not be used either for regular or emergency use, unless the drinking water supplied to the users of such public water system complies with 310 CMR 22.00. The Department may require a public water system to sample and analyze its water for any parameter at any location and frequency which the Department deems necessary to ascertain the purity of water and fitness of a system to ensure the delivery of a fit and pure water supply to all consumers.

(2) 310 CMR 22.00 shall apply to each public water system in the Commonwealth except a public water system which meets all the following requirements:

- (a) Said system consists only of distribution and storage facilities (and does not have any collection and treatment facilities);
- (b) Said system obtains all of its water from but is not owned by or operated by, a public water system to which such regulations apply;
- (c) Said system does not sell water to any person; and
- (d) Said system is not a carrier which conveys passengers in commerce.

(3) Where the Department, in consultation with the Department of Public Health, determines that (1) a supplier of water is supplying drinking water in violation of 310 CMR 22.00, and (2) an order to cease supplying such water would pose a significantly greater hazard to the public health than the continued supplying of such water in violation of 310 CMR 22.00, the Department may authorize the supplying of such water subject to such conditions as may be imposed by the commissioner, but only for a temporary, non-renewable period not to exceed the amount of time the supplier of water reasonably needs to either eliminate the violation or promptly apply for and obtain a variance or exemption.

(4) The Department shall report all violations of 310 CMR 22.00 to the Massachusetts Department of Public Health promptly upon obtaining knowledge of such violations, and shall consult with the Massachusetts Department of Public Health with regard to enforcement actions taken to obtain compliance with 310 CMR 22.00.

(5) No person shall violate, or cause to be violated, any local zoning or nonzoning control that is a requirement of an approved wellhead protection plan or a watershed protection/control program.

(6) In the event the Department finds on the basis of a health assessment made by the Department's Office of Research and Standards that the level of contaminants found in water collected at the sampling point to the distribution system which is representative of each source, pose an unacceptable health risk to consumers, acting alone or in combination with other contaminants, the supplier of water shall take appropriate actions to reduce the level of contaminant concentrations to levels the Department deems safe or remove the source of supply from service by the deadline specified by the Department, and monitor the source as directed by the Department. The Department may require the supplier of water to notify the Department of the actions it intends to take in response to a finding that a source of supply poses an unacceptable risk to health.

(7) No supplier of water may violate, or cause to be violated, any treatment technique requirement established by 310 CMR 22.20A. A supplier of water subject to one or more treatment technique requirements must take appropriate action to timely come into compliance with each such requirement. The Department may require a supplier of water to notify the Department of the actions it intends to take to come into compliance with each treatment technique requirement. Each such notice must include, at a minimum, a schedule that includes

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the dates by which the supplier of water will hire a professional engineer to prepare plans and specifications, submit draft and final design plans and specifications to the Department for approval, request bids for construction, award a contract for construction, and commence and complete construction of the work necessary.

(8) All water quality data submitted to the Department shall be analyzed by a laboratory certified pursuant to 310 CMR 42.00 unless otherwise specified by the Department. All water quality data for contaminants listed in 310 CMR 22.00, including additional or voluntary samples, shall be submitted to the Department, unless otherwise specified by the Department.

(9) The Department may require special purpose samples collected by the public water system and analyzed by a certified laboratory using approved methods as specified at 310 CMR 42.00 to be used to determine compliance with the applicable MCL

22.04: Construction, Operation and Maintenance of Public Water Systems

(1) No person shall construct, substantially modify, or operate a public water system without the prior written approval of the Department. The Department will not grant such approval unless:

- (a) the source of supply that will be used in the system meets the criteria set forth in 310 CMR 22.20A, A & B, and 310 CMR 22.21, whichever is applicable;
- (b) the storage, treatment and distribution facilities that will be used in the system have been designed and constructed in accordance with 310 CMR 22.19 and the Division of Water Supply's "Guidelines and Policies for Public Water Systems", and
- (c) the person(s) who will own and operate the system demonstrates to the Department's satisfaction it has the technical, managerial and financial resources to operate and maintain the system in a reliable manner and provide continuous adequate service to consumers.

(2) To the extent practicable, said person shall avoid locating all or any part of a new or substantially modified facility at a site which:

- (a) is subject to a significant risk from earthquakes, floods, fires, or other disasters which could cause a breakdown of the public water system or a portion thereof;
- (b) except for intake structures, is within the floodplain of a 100-year flood or is lower than any recorded high tide where appropriate records exist; and can reasonably obtain service from an existing system (the Department shall consider proximity to existing systems and the economic feasibility of extending service).

(3) Persons seeking Department approval to construct, substantially modify or operate a public water system shall:

- (a) submit to the Department plans, specifications, standard operating and maintenance procedures and proposed staffing for the system prepared by a professional engineer, registered in the Commonwealth under M.G.L. c. 112, as amended;
- (b) submit information demonstrating he or she has the technical, managerial and financial resources to operate and maintain the system in a reliable manner and to provide continuous adequate service to consumers; and
- (c) furnish any additional information the Department may require upon request.

(4) Each supplier of water must operate and maintain its system in a manner that ensures the delivery of safe drinking water to consumers. In determining whether a supplier of water is properly operating and maintaining a public water system, the Department will apply the standards for public water systems set forth in the Division of Water Supply's "Guidelines and Policies for Public Water Systems,"

(5) A supplier of water may not add any chemical or substance for the purpose of treating water in a public water system, including, but not limited to, drinking water additives, filtration devices, coatings, pipes and tanks that come into direct contact with drinking water, unless it can be documented to the Department's satisfaction that such additives or water works have been approved by the Department. Any application of an herbicide to any surface waterbody that serves as a source of water for a public water system shall comply with 310 CMR 22.20B(10).

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(6) The Department may require persons seeking approval of a disinfection or filtration treatment system or process for use in a public water system to perform a pilot study to determine whether the proposed system or process will perform adequately in the field. Persons required to perform such a study should follow the procedures set forth in the Division's policy entitled "Pilot Study Requirements for Proposed Surface Water Treatment/Filtration Plants," DWS Policy No. 90-04, a copy of which is available from the Division of Water Supply.

(7) Treatment Techniques for Acrylamide and Epichlorohydrin: Each supplier of water using acrylamide or epichlorohydrin in a public water system shall certify annually in writing annually to the Department (using third party or manufacturer's certification) that the combination (or product) of dose and monomer level does not exceed the levels specified as follows:

Acrylamide = 0.05% dosed at 1 ppm (or equivalent)

Epichlorohydrin = 0.01% dosed at 20 ppm (or equivalent)

Such certifications shall be made by the manufacturers or third parties, as approved by the Department.

(8) New Product or Technology: A product or technology not yet successfully used in Massachusetts or approved by the Department will be considered by the Department for approval and placement on the new technology approval list if the manufacturer demonstrates that:

- (a) the product or technology conforms to ANSI/NSF Standard 60 or 61, whichever is applicable; or
- (b) the product or technology received approval from the EPA prior to April 1990 and conforms to the American Water Works Association's standards; or
- (c) is field tested by an independent testing laboratory to the Department's satisfaction; or
- (d) performs to the Department's satisfaction during an approved pilot study.

Persons seeking to have a product or technology listed are directed to follow the procedures set forth in the Division's policy entitled "New Product or Technology Review Policy," DWS Policy No. 89-01, a copy of which is available from the Division of Water Supply. The Department may remove any product or technology approved in accordance with 310 CMR 22.04(9) from the list if the Department subsequently finds the product or technology defective or inadequate in the field.

(9) Sanitary Surveys. The Department or its agent shall conduct sanitary surveys of community and NTNC public water systems to evaluate each system's source, facilities, equipment, operation, monitoring schedule and maintenance procedures at a frequency determined by the Department.

(a) If any violation of 310 CMR 22.00, M.G.L. c. 111, § 160 or any other statute or regulations administered by the Department is found, the public water system shall be notified of the violation, the action necessary to comply with the statute or regulations, and the time period within which compliance must be attained. If any other deficiency is found, the sanitary survey report shall require its correction to assure the provision of fit and pure water pursuant to M.G.L. c. 111, § 160. Each sanitary survey report shall specify whether it shall also be considered a Notice of Noncompliance for purposes of 310 CMR 5.00.

(b) The owner of a Transient Non-Community Water Systems (TNC) shall be responsible for conducting or having a sanitary survey conducted by June 29, 1999 to evaluate the system's source, facilities, equipment, operation, monitoring schedule and maintenance plan. Thereafter, said systems shall undergo another sanitary survey every five years. The survey information shall be submitted to the Department on a form provided by the Department for such use no later than 90 days after the completion of the survey. The Department will review the results of each sanitary survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the system needs to undertake to improve drinking water quality. In conducting the survey the public water system shall be subject to 310 CMR 22.04(9).

22.05: Maximum Microbiological Contaminant Levels, Monitoring Requirements and Analytical Methods(1) Routine Coliform Monitoring.

(a) Each supplier of water must collect total coliform samples at sites which are representative of water throughout the distribution system, at the entry point to the distribution system, and at storage facilities if applicable. A raw water source sample shall be collected monthly if the water at the entry point to the distribution system is not representative of the source. All samples must be taken at sites according to a written sample site plan unless otherwise authorized by the Department in writing. These plans are subject to review, revision and approval by the Department. Systems which do not treat their sources and are under 3,300 population will be exempt from the raw water sampling requirement. The total coliform positive raw water sample shall not trigger the requirements of 310 CMR 22.05(2).

(b) The monitoring frequency for total coliform for community water systems is based on the population served by the system according to Table 1-22.05. If a community water system serving 25 to 1,000 persons has no history of total coliform contamination in its current configuration and a sanitary survey conducted in the past five years shows that the system is supplied solely by a protected groundwater source and is free of sanitary defects, the Department may reduce the monitoring frequency specified in Table 1-22.05, in writing, to not less than one sample per quarter.

Table 1-22.05
TOTAL COLIFORM MONITORING FREQUENCY
FOR COMMUNITY WATER SYSTEMS

Population served	Minimum number of samples per month
25 to 1,000 ¹	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

¹ Includes public water systems which have at least 15 service connections, but serve fewer than 25 persons.

22.05: continued

(c) The minimum monitoring frequency for total coliform for non-community water systems is as follows:

1. A non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in 310 CMR 22.02) and serving 1,000 persons or fewer must monitor each calendar quarter that the system provides water to the public.
2. A non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in 310 CMR 22.02) and serving more than 1,000 persons during any month must monitor at the same frequency as a like-sized community water system, as specified in 310 CMR 22.05(1)(b), except the Department may reduce this monitoring frequency, in writing, for any month the system serves 1,000 persons or fewer to no less than once per quarter. For systems using ground water under the direct influence of surface water, 310 CMR 22.05(1)(c)4. applies.
3. A non-community water system using surface water, in total or in part, must monitor at the same frequency as a like-sized community water system, as specified in 310 CMR 22.05(1)(b), regardless of the number of persons it serves.
4. A non-community water system using ground water under the direct influence of surface water, as defined in 310 CMR 22.02 must monitor at the same frequency as a like-sized community water system, as specified in 310 CMR 22.05(1)(b). The system must begin monitoring at this frequency beginning six months after the Department determines that the ground water is under the direct influence of surface water.

(d) A public water system must collect samples at regular time intervals throughout the month, except that a system which uses ground water (except ground water under the direct influence of surface water, as defined in 310 CMR 22.02) and serves 4,900 persons or fewer, may collect all required samples on a single day if they are taken from different sites.

(e) A public water system that uses surface water or ground water under the direct influence of surface water, as defined in 310 CMR 22.02, does not provide filtration in compliance with 310 CMR 22.20A, and is seeking to avoid filtration, must collect at least one sample near the first service connection each day the turbidity level of the source water, measured as specified in 310 CMR 22.20A(5)(b)2. exceeds 1 NTU. This sample must be analyzed for the presence of total coliform. When one or more turbidity measurements in any day exceeds 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the Department determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection. Sample results from this coliform monitoring must be included in determining compliance with the MCL for total coliform in 310 CMR 22.05(8).

(f) Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliform in 310 CMR 22.05(8). Repeat samples taken pursuant to 310 CMR 22.05(2) are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliform in 310 CMR 22.05(8).

(2) Repeat monitoring.

(a) If a routine sample is total coliform-positive, the public water system must collect a set of repeat samples within 24 hours of being notified of the positive result. A system which collects more than one routine sample/month must collect no fewer than three repeat samples for each total coliform-positive sample found. A system which collects one routine sample/month or fewer must collect no fewer than four repeat samples for each total coliform-positive sample found. The Department may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control.

(b) The system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one away from the end of the distribution system, the Department may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site.

22.05: continued

(c) The system must collect all repeat samples on the same day, except that the Department may allow a system with a single service connection to collect a repeat sample of 200 ml on each of two consecutive days.

(d) If one or more repeat samples in the set is total coliform-positive, the public water system must collect an additional set of repeat samples in the manner specified in 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(c). The additional samples must be collected within 24 hours of being notified of the positive result, unless the Department extends the limit as provided in 310 CMR 22.05(2)(a). The system must repeat this process until either total coliforms are not detected in one complete set of repeat samples or the system determines that the MCL for total coliform in 310 CMR 22.05(8) has been exceeded and notifies the Department in accordance with 310 CMR 22.15.

(e) If a system collecting fewer than five routine samples/month has one or more total coliform-positive samples and the Department does not invalidate the sample(s) under 310 CMR 22.05(3), it must collect at least five routine samples during the next month the system provides water to the public, except that the Department may waive this requirement if the conditions of 310 CMR 22.05(2)(e)1. or 310 CMR 22.05(2)(e)2. are met. The Department cannot waive the requirement for a system to collect repeat samples in 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(d).

1. The Department may waive the requirement to collect five routine samples the next month the system provides water to the public if the Department or an agent approved by the Department performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Department to determine whether additional monitoring and/or any corrective action is needed. This site visit must not be conducted by an employee of the system.

2. The Department may waive the requirement to collect five routine samples the next month the system provides water to the public if the Department has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case, the Department will document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Department official who recommended the decision, and make this document available to the EPA and public. The written documentation will describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem. The Department will not waive the requirement to collect five routine samples the next month the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. Under 310 CMR 22.05(2)(e)2., a system must still take at least one routine sample before the end of the next month it serves water to the public and use it to determine compliance with the MCL for total coliform in 310 CMR 22.05(8) unless the Department has determined that the system has corrected the contamination problem before the system took the set of repeat samples required in 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(d), and all repeat samples were total coliform-negative.

(f) After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliform, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.

(g) Results of all routine and repeat samples not invalidated by the Department must be included in determining compliance with the MCL for total coliform in 310 CMR 22.05(8).

(3) Invalidation of total coliform samples. A total coliform-positive sample invalidated under 310 CMR 22.05(3) does not count towards meeting the minimum monitoring requirements of 310 CMR 22.05(3).

(a) The Department may invalidate a total coliform-positive sample only if the conditions of 310 CMR 22.05(3)(a)1., 310 CMR 22.05(3)(a)2., or 310 CMR 22.05(3)(a)3. are met.

1. The laboratory establishes that improper sample analysis caused the total coliform-positive result.

22.05: continued

2. The Department, on the basis of the results of repeat samples collected as required by 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(d), determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The Department cannot invalidate a sample on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected within five service connections of the original tap are total coliform-negative (e.g. the Department will not invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the public water system has only one service connection).

3. The Department has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required under 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(d), and use them to determine compliance with the MCL for total coliform in 310 CMR 22.05(8). To invalidate a total coliform-positive sample under 310 CMR 22.05(3)(a)3., the decision with the rationale for the decision must be documented in writing, and approved and signed by the supervisor of the Department official who recommended the decision. The Department must make this document available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take to correct this problem. The Department may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

(b) A laboratory must invalidate a total coliform sample (unless total coliform are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple-Tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g., Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliform. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The Department may waive the 24-hour time limit on a case-by-case basis.

(4) Reserved

(5) Fecal coliform/*Escherichia coli* (*E. coli*)

(a) If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine if fecal coliform are present, except that the system may test for *E. coli* in lieu of fecal coliform. If fecal coliform or *E. coli* are present, the system must notify the Department by the end of the day that the system is notified of the test result, unless the system is notified of the result after the Department is closed, in which case the system must notify the Department before the end of the next business day.

(b) The Department has the discretion to allow a public water system, on a case-by-case basis, to forgo fecal coliform or *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is fecal coliform or *E. coli*-positive. Accordingly, the system must notify the Department as specified in 310 CMR 22.05(5)(a) and the provisions of 310 CMR 22.05(8)(b) shall apply.

(6) Analytical methodology.

(a) The standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 ml. Sample should be tested within two hours of receipt in the laboratory. However, the time from sample collection to initiation of analysis shall not exceed 30 hours. Samples should be kept at 10°C during transport or shipping to the laboratory.

22.05: continued

(b) Public water systems need only determine the presence or absence of total coliform; a determination of total coliform density is not required.

(c) Public water systems must conduct total coliform analyses in accordance with one of the following analytical methods set forth below in 310 CMR 22.05(6)(c)1 through 5. These methods are contained in the 18th or latest edition of *Standard Methods for the Examination of Water And Wastewater*, 1992, American Public Health Association, 1015 Fifteenth Street NW., Washington, DC 20005.

1. Total Coliform Fermentation Technique. Lactose broth, as commercially available, may be used in lieu of lauril tryptose broth, if the system conducts at least 25 parallel tests between this medium and lauril tryptose broth using the water normally tested, and this comparison demonstrates that the false-positive rate for total coliform, using lactose broth, is less than 10%. If inverted tubes are used to detect gas production, the media should cover these tubes at least $\frac{1}{2}$ to $\frac{2}{3}$ after the same is added. No requirement exists to run the complete phase on 10% of all total coliform-positive confirmed tubes.

2. Total Coliform Membrane Filter (MF) Technique.

3. Presence-Absence (P-A) Coliform Test. No requirement exists to run the completed phase on 10% of all total coliform-positive confirmed tubes. Six-times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.

4. ONPG-MUG Test. The ONPG-MUG Test is also known as the Autoanalysis Colilert System.

5. Colisure Test. The Colisure Test must be incubated for 28 hours before examining the results. If an examination of the results at 28 hours is not convenient, then results may be examined at any time between 28 hours and 48 hours. A description of the Colisure Test may be obtained from the Millipore Corporation, Technical Services Department, 80 Ashby Road, Bedford, MA 01730.

(d) In lieu of the 10-tube MTF Technique specified in 310 CMR 22.05(6)(c)1., a public water system may use the MTF Technique using either five tubes (20-ml sample portions) or a single culture bottle containing the culture medium for the MTF Technique i.e., lauril tryptose broth (formulated as described in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association et al., 16th Edition, Method 908A - pp. 872), as long as a 100-ml water sample is used in the analysis.

(e) Each supplier of water must conduct fecal coliform analysis in accordance with the following procedure. When the MTF Technique or Presence-Absence (P-A) Coliform Test is used to test for total coliform, shake the lactose-positive presumptive tube or P-A bottle vigorously and transfer the growth with a sterile 3-mm loop or sterile applicator stick into brilliant green lactose bile broth and EC medium to determine the presence of total and fecal coliform, respectively. For EPA-approved analytical methods which use a membrane filter, remove the membrane containing the total coliform colonies from the substrate with a sterile forceps and carefully curl and insert the membrane into a tube of EC medium. (The laboratory may first remove a small portion of selected colonies for verification.) Gently shake the inoculated EC tubes to insure adequate mixing and incubate in a water bath at $44.5 \pm 0.2^\circ\text{C}$ for 24 ± 2 hours. Gas production of any amount in the inner fermentation tube of the EC medium indicates a positive fecal coliform test. The preparation of EC medium is described in *Standard Methods for the Examination of Water and Wastewater*, 1992 18th Edition, Method 9221E-p.9-52, paragraph 1a. Public Water systems need only determine the presence or absence of fecal coliform; a determination of fecal coliform density is not required.

(f) Copies of the analytical methods cited in *Standard Methods for the Examination of Water and Wastewater* may be obtained from the American Public Health Association; 1015 Fifteenth Street, NW.; Washington, DC 20005. Copies of the methods set forth in *Microbiological Methods for Monitoring the Environment, Water and Wastes* may be obtained from ORD Publications, U.S. EPA, 26 W. Martin Luther King Drive, Cincinnati, Ohio 45268. Copies of the MMO-MTG Test as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliform and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg et al.) may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235. Copies may be inspected at EPA's Drinking Water Docket: 401 M Street, SW.; Washington, DC 20460, or at the Office of the Federal Register: 1100 L Street, NW.; Room 8401; Washington, DC 20408.

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(7) Response to violation.

- (a) A public water system which has exceeded the MCL for total coliform in 310 CMR 22.05(8) must report the violation to the Department no later than the end of the next business day after it learns of the violation, and notify the public in accordance with 310 CMR 22.16.
- (b) A public water system which has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, must report the monitoring violation to the Department within ten days after the system discovers the violation, and notify the public in accordance with 310 CMR 22.16.

(8) Maximum contaminant levels (MCLs) for microbiological contaminants.

- (a) The MCL is based on the presence or absence of total coliform in routine samples, rather than coliform density.
 - 1. For a system which collects at least 40 routine samples per month, if no more than 5.0% of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL of total coliform.
 - 2. For a system which collects fewer than 40 routine samples/month, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliform.
- (b) Any fecal coliform-positive repeat sample or *E. coli*-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or *E. coli*-positive routine sample constitutes a violation of the MCL for total coliforms. For purposes of the public notification requirements in 310 CMR 22.16 this is a violation that may pose an acute risk to health.
- (c) A public water system must determine compliance with the MCL for total coliforms in 310 CMR 22.05(8)(a) and 310 CMR 22.05(8)(b) for each month in which it is required to monitor for total coliforms.

(9) Best available technology, treatment techniques. The following have been determined to provide best available technology, treatment techniques or other means available for achieving compliance with the maximum contaminant level for total coliform in 310 CMR 22.05(8)(a) and 310 CMR 22.05(8)(b):

- 1. Protection of wells from contamination by coliforms by appropriate placement and construction;
- 2. Maintenance of a disinfectant residual throughout the distribution system;
- 3. Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, and continual maintenance of positive water pressure in all parts of the distribution system;
- 4. Filtration and/or disinfection of surface water, as described in 310 CMR 22.20A or disinfection of ground water using strong oxidants such as chlorine, chlorine dioxide, or ozone; or
- 5. The development and implementation of a Department approved wellhead protection program under 310 CMR 22.21.

(10) Variances From The Total Coliform MCL: A public water system may be issued a variance by the Department to the total coliform MCL (310 CMR 22.05(8)) provided that said system can demonstrate that no unreasonable risk to health exists using the following criteria:

- (a) Over the past 30 days, water entering the distribution system is shown to:
 - 1. Be free from *E. Coli* or fecal coliform occurrence based on at least daily sampling.
 - 2. Contain less than one total coliform per hundred milliliters of influent water in at least 95% of all samples based on at least daily sampling.
 - 3. Comply with the total turbidity requirements of 310 CMR 22.08, except that surface waters presently filtering should comply with 310 CMR 22.20A(4), and
 - 4. Contain a continuous disinfection residual of at least 0.2 mg/l;
- (b) The system has had no waterborne disease outbreak while operated in its present configuration:

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- (c) The system maintains biweekly contact with the Division of Water Supply and the local board of health to assess illness possibly attributed to microbial occurrence in the public drinking water system;
- (d) The system has evaluated, on a monthly basis, at least the number of samples specified in 310 CMR 22.05(1)(b) and has not had an *E. Coli*-positive compliance sample within the last six months, unless the system demonstrates to the Department that the occurrence is not due to contamination entering the distribution system;
- (e) The system has undergone a sanitary survey conducted by the Department within the past 12 months;
- (f) The system has a cross connection control program acceptable to the Department and performs an audit of the effectiveness of the program;
- (g) The system agrees to submit a biofilm control plan to the Department within 12 months of the first request for a variance;
- (h) The system monitors general distribution system bacterial quality by conducting heterotrophic bacteria plate counts on at least a weekly basis at a minimum of 10% of the number of total coliform sites specified for that system size in 310 CMR 22.05(1)(b) (preferably using R₂A medium and the procedure outlined in the 18th edition of *Standard Methods for the Examination of Water and Wastewater*, 1992, American Public Health Association, *et.al.*); and
- (i) The system conducts daily monitoring at distribution system sites approved by the Department and maintains a detectable disinfectant residual (measured as specified in 310 CMR 22.20A(5)(a)5.) at a minimum of 95% of those points and a heterotrophic plate count of less than 500 colonies per ml (measured as specified in 310 CMR 22.20A(5)(a)3.) at sites without a disinfectant residual.

22.06: Inorganic Chemical Maximum Contaminant Levels, Monitoring Requirements and Analytical Methods

- (1) Monitoring: A supplier of water shall collect samples of water as specified in 310 CMR 22.06(4) and provide for analysis of such samples for inorganic chemical contaminants listed in 310 CMR 22.06(2)(a) consistent with the requirements set forth in 310 CMR 22.06(5), (6), (7), (8) and methods set forth in 310 CMR 22.06(15).

All analytical results shall be rounded to the same number of significant figures as the applicable MCL or SMCL.

- (2) Inorganic Maximum Contaminant Levels (MCLs): The maximum contaminant levels for inorganic contaminants specified in 310 CMR 22.06(2)(b) through (g) and (k) through (p) apply to community water systems and non-transient non-community water systems. The maximum contaminant level specified in 310 CMR 22.06(2)(a) only applies to community water systems. The Maximum Contaminant Levels specified in 310 CMR 22.06(2)(h), (i) and (j) apply to community, non-transient non-community, and transient non-community water systems.

MAXIMUM CONTAMINANT LEVELS FOR INORGANIC CHEMICALS

<u>Contaminant</u>	<u>MCL (mg/l)</u>
(a) Fluoride (C)	4.0
(b) Asbestos (C, NTNC)	7 Million Fibers/liter (longer than 10 μ m)
(c) Arsenic (C, NTNC)	0.05
(d) Barium (C, NTNC)	2
(e) Cadmium (C, NTNC)	0.005
(f) Chromium (C, NTNC)	0.1
(g) Mercury (C, NTNC)	0.002
(h) Nitrate (C, NTNC, TNC)	10 (as Nitrogen)
(i) Nitrite (C, NTNC, TNC)	1 (as Nitrogen)
(j) Total Nitrate & Nitrite (C, NTNC, TNC)	10 (as Nitrogen)

22.06: continued

MAXIMUM CONTAMINANT LEVELS FOR INORGANIC CHEMICALS - continued

<u>Contaminant</u>	<u>MCL (mg/l)</u>
(k) Selenium (C,NTNC)	0.05
(l) Antimony (C,NTNC)	0.006
(m) Beryllium (C,NTNC)	0.004
(n) Cyanide (C,NTNC)	0.2
(n) Nickel (C,NTNC)	Reserved
(p) Thallium (C,NTNC)	0.002

C = Community Systems; NTNC = Non-transient non-community systems; TNC = Transient non-community

(3) Inorganic Chemicals (IOC): Sampling and Analytical Requirements: Community water systems and non-transient non-community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in 310 CMR 22.06(2) in accordance with 310 CMR 22.06. Transient, non-community water systems shall conduct monitoring to determine compliance with the MCL's for nitrate, nitrite and total nitrate in 310 CMR 22.06(2)(h)(i)(j) (as appropriate) in accordance with 310 CMR 22.06.

(4) Sampling Protocol: Monitoring shall be as follows:

(a) Ground Water Sampling Points: Groundwater systems shall take one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point) beginning in the compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) Surface Water Sampling Points: Surface water systems (Note: For purposes of 310 CMR 22.06(4)(b), surface water systems include systems with a combination of surface and ground sources.) shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in the compliance period beginning January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources: If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

(d) Composite Sampling: The total number of samples which must be analyzed may be reduced by compositing samples. Composite samples from a maximum of five sampling points are allowed provided that the detection limit of the method used for analysis is less than one-fifth of the MCL and none of the samples to be composited are representative of multiple sources. Compositing of samples must be approved by the Department and must be done in the laboratory. Compositing of source with previous detects is not allowed, unless otherwise authorized by the Department

1. If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be analyzed within 14 days from each sampling point included in the composite. These samples must be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample. Detection limits for each analytical method and MCL are the following:

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DETECTION LIMITS FOR INORGANIC CONTAMINANTS

<u>Contaminant</u>	<u>MCL(mg/l)</u>	<u>Methodogy</u>	<u>Detection Limit (mg/l)</u>
Antimony	0.006	Atomic Absorption; furnace	0.003
			0.0008 ⁶
	.0004	ICP-Mass Spectrometry	0
Arsenic	0.05	Hydride-Atomic absorption	0.001
Asbestos	7 MFL ²	NA	
		Transmission Electron Microscopy	0.02 MFL
Barium	2	Atomic Absorption; furnace technique	0.002
		Atomic Absorption; direct aspiration	0.1
		Inductively Coupled Plasma	0.002
			(0.001)
Beryllium	0.004	Atomic Absorption; furnace	0.0002
		Atomic Absorption; platform	0.00002
		Inductively Coupled Plasma ³	0.0003
		ICP-Mass Spectrometry	0.0003
Cadmium	0.005	Atomic Absorption; furnace technique	0.0001
		Inductively Coupled Plasma ¹	0.001
Chromium	0.1	Atomic Absorption; furnace technique	0.001
		Inductively Coupled Plasma	0.007
			(0.001) ¹
Cyanide	0.2	Distillation, Spectrophotometric ⁴	
		Distillation, Automated, Spectrophotometric ⁴	0.005
		Distillation, Selective Electrode ⁴	0.02
		Distillation, Amenable, Spectrophotometric ⁵	0.0002
Mercury	0.002	Manual Cold Vapor Technique	0.0002
		Automated Cold Vapor Technique	0.0002
Nickel	0.01	Atomic Absorption; furnace	0.001
		Atomic Absorption: Platform	0.0006
		Inductively Coupled Plasma ³	0.005
		ICP-Mass Spectrometry	0.0005
Nitrate	10 (as N)	Manual Cadmium Reduction	0.01
		Automated Hydrazine Reduction	0.01
		Automated Cadmium Reduction	0.05
		Ion Selective Electrode	1
		Ion Chromatography	0.01
Nitrite	1 (as N)	Spectrophotometric	0.01
		Automated Cadmium Reduction	0.05
		Manual Cadmium Reduction	0.01
		Ion Chromatography	0.004
Selenium	0.05	Atomic Absorption; furnace	0.002
		Atomic Absorption: gaseous hydride	0.002
Sodium		See 310 CMR 22.06A	
Thallium	0.002	Atomic Absorption; furnace	0.001
		Atomic Absorption; platform	0.0007 ⁶
		ICP-Mass Spectrometry	0.0003

¹ Using concentration technique in Appendix A to EPA Method 200.7.² MFL = million fibers per liter >10 μ m.³ Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.⁴ Screening methods for total cyanides.⁵ Measures "free" cyanides.⁶ Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

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2. If the population served by the system is $>3,300$ persons, then compositing may only be permitted at sampling points within a single system. In systems serving $\leq 3,300$ persons, compositing among different systems may be allowed with the approval of the Department, provided the five-sample limit is maintained.

3. If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the Department within 14 days of collection.

(e) Frequency Requirements for IOC Monitoring: The frequency of monitoring for asbestos shall be in accordance with 310 CMR 22.06(5); the frequency of monitoring for antimony, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be in accordance with 310 CMR 22.06(6); the frequency of monitoring for nitrate shall be in accordance with 310 CMR 22.06(7); and the frequency of monitoring for nitrite shall be in accordance with 310 CMR 22.06(8).

(f) Consecutive System Monitoring: Public water systems that obtain water from another public water system are exempt from conducting compliance monitoring for the purchased portion of the system for the inorganic chemicals under 310 CMR 22.06, provided that the system from which the water is obtained has conducted the analyses required under 310 CMR 22.06, unless otherwise specified by the Department. These systems are not exempt from 310 CMR 22.06(5) asbestos sampling.

(5) Asbestos Sampling Frequency: The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in 310 CMR 22.06(2) shall be conducted as follows:

(a) Initial Sampling Frequency: Each community and non-transient, non-community water system is required to monitor for asbestos during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993 as specified in 310 CMR 22.06(5)(e), (f) and (g).

(b) Sampling During Waiver: If the system believes it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, it may apply to the Department for a waiver of the monitoring requirement in 310 CMR 22.06(5)(a). If the Department grants the waiver, the system will be required to monitor pursuant to 310 CMR 22.06(5)(d).

(c) Basis of an Asbestos Waiver: The granting of a waiver will be based on a consideration of the following factors:

1. Potential asbestos contamination of the water source, and
2. The use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

(d) Effect of an Asbestos Waiver: A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions of 310 CMR 22.06(5)(a).

(e) Distribution System Sampling Criteria for Asbestos: A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take at a minimum one sample at a tap approved by the Department. This tap location must be served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur. Additional sample locations (taps) may be required if in the Department's opinion the use of asbestos-cement is extensive and contamination is likely to occur in several areas of the system.

(f) Source Water Sampling Criteria for Asbestos: A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of 310 CMR 22.06(2) and 22.06(4).

(g) Combined Asbestos Vulnerability: A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall monitor in accordance with 310 CMR 22.06(5)(e) and (f).

(h) Exceeding the Asbestos MCL: A system which exceeds the maximum contaminant levels as determined in 310 CMR 22.06(2) and 22.06(12) shall report to the Department within seven days and shall monitor quarterly beginning in the next quarter after the violation occurred.

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- (i) Average Exceeding MCL: When the average of four analyses made pursuant to 310 CMR 22.06(5)(h), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give public notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.
- (j) Asbestos Reliably & Consistently Below the MCL: The quarterly monitoring requirement may be decreased to the frequency specified in 310 CMR 22.06(5)(a) provided the Department has determined that the system is reliably and consistently below the maximum contaminant level and a groundwater system has taken a minimum of two quarterly samples and a surface (or combined surface/ground) water system has taken a minimum of four quarterly samples.
- (k) Grandfathered Asbestos Data: If monitoring data collected after January 1, 1990 are generally consistent with the requirements of 310 CMR 22.06(5), the data may be used with the Department's approval, to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.
- (6) Sampling Frequency for IOCs: The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in 310 CMR 22.06(2) for antimony, arsenic, beryllium, barium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:
- (a) IOCs Sampling Frequency: Groundwater systems shall take one sample at each sampling point once every three years. Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point.
 - (b) IOCs Sampling Waiver: The system may apply to the Department for a waiver from the monitoring frequencies specified in 310 CMR 22.06(6)(a).
 - (c) IOC Sampling During a Waiver: A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle (i.e., nine years).
 - (d) Basis of an IOC Waiver & Grandfathered Data: A waiver may be granted by the Department provided the surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (Analytical monitoring results must have been representative of all sources at the time of sampling and at least one sample shall have been taken since January 1, 1990.) Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.
 - (e) Basis of the IOC Sampling Frequency During a Waiver: The granting of a waiver by the Department will be based on the following:
 1. Reported concentrations from all previous monitoring;
 2. The degree of variation in reported concentrations; and
 3. Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.
 - (f) Effect of an IOC Waiver: A supplier of water must have received a written approval from the Department which shall set forth the basis for the determination. The determination may be initiated by the Department or upon an application by the public water system. The public water system shall specify the basis for its request. The Department may revise its determination of the appropriate monitoring frequency, if the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available.
 - (g) Exceeding an IOC MCL: Systems which exceed the maximum contaminant levels as calculated by 310 CMR 22.06(2) and 22.06(12) shall report to the Department within seven days and shall monitor quarterly beginning in the next quarter after the violation occurred.

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- (h) Average Exceeding MCL: When the average of four analyses made pursuant to 310 CMR 22.06(6)(g), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give public notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.
- (i) IOCs Reliably & Consistently Below the MCL: If the system is reliably and consistently below the maximum contaminant level, the quarterly monitoring requirement may be decreased with the Department's approval to the frequencies specified in 310 CMR 22.06(6)(a) and (6)(b). Systems requesting this decrease must have taken at a minimum two quarterly samples for a groundwater system and four quarterly samples for a surface water system.
- (7) Sampling Frequency for Nitrate: All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate specified in 310 CMR 22.06(2).
- (a) Initial Nitrate Sampling: Community and non-transient, non-community water systems served by groundwater source shall monitor annually beginning January 1, 1993; systems served by surface water shall monitor quarterly beginning January 1, 1993.
- (b) Transient Non-Community Nitrate Sampling Frequency: Each transient non-community water system shall monitor annually beginning January 1, 1993.
- (c) Ground Water Repeat Nitrate Sampling Frequency: For all public water systems: the repeat monitoring frequency for ground water systems shall be quarterly for at least one year following any one sample in which the concentration is $\geq 50\%$ the MCL. A groundwater system may reduce the sampling frequency to annually with the Department's approval, after four consecutive quarterly samples are reliably and consistently less than the MCL.
- (d) Surface Water Repeat Nitrate Sampling Frequency: For all public water systems with surface water sources may reduce the sampling frequency to annually with the Department's approval, if all analytical results from four consecutive quarters are $< 50\%$ of the MCL. A surface water system shall return to quarterly monitoring if any one sample is $\geq 50\%$ of the MCL.
- (e) Scheduling Annual Nitrate Repeat Samples: After the initial round of quarterly sampling is completed, all public water systems which are monitoring quarterly because the concentration of any one sample was $> 50\%$ of the MCL shall take subsequent annual samples during the quarter(s) which previously resulted in the highest analytical result.
- (8) Sampling Frequency for Nitrite: All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in 310 CMR 22.06(2)(h), (i) and (j).
- (a) Initial Nitrite Sampling: All public water systems shall take one sample at each sampling point in the compliance period beginning January 1, 1993 and ending December 31, 1995.
- (b) Under the Nitrite Trigger Level: After the initial sample, systems where an analytical result for nitrite is $< 50\%$ of the MCL shall monitor at the frequency specified by the Department.
- (c) Above the Nitrite Trigger Level: For community, non-transient, non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is $\geq 50\%$ of the MCL. With the Department's approval, a system may reduce the sampling frequency to annually if the system is reliably and consistently less than the MCL.
- (d) Scheduling of Annual Nitrite Repeat Samples: Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.

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(9) Confirmation Sampling:

(a) Deadline for IOCs Confirmation Samples: Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium, or thallium indicate an exceedance of the maximum contaminant level, one additional sample shall be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.

(b) Deadline for Nitrate & Nitrite Confirmation Samples: Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample and shall report to the Department within seven days. Systems unable to comply with the 24-hour sampling requirement must immediately notify the consumers served by the area served by the public water system in accordance with 310 CMR 22.16. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

(c) Compliance Calculations & Confirmation Samples: The results of the initial and confirmation sample shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with 310 CMR 22.06(12). Obvious sampling errors may be deleted with the approval of the Department.

(10) Increased Sampling Frequency: The Department may require more frequent monitoring than specified in 310 CMR 22.06(5), (6), (7) and (8) or may require confirmation samples for positive and negative results at its discretion.

(11) PWS Request for Increased Sampling Frequency: Systems may apply to the Department to conduct more frequent monitoring than the minimum monitoring frequencies specified in 310 CMR 22.06.

(12) Compliance Calculations: Compliance with MCL's set out in 310 CMR 22.06(2) shall be determined based on the analytical result(s) obtained at each sampling point.

(a) Sampling Frequencies Greater Than Annual: For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels listed in 310 CMR 22.06(2) with the exception of nitrate and nitrite, is determined by a running annual average at each sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the method detection limit shall be calculated at zero for the purpose of determining the annual average.

(b) Sampling Frequencies of Annual or Less: For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels listed in 310 CMR 22.06(2) with the exception of nitrate and nitrite, if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is collected, the determination of compliance will be based on the average of the two samples.

(c) Compliance Calculations for Nitrate & Nitrite: Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample if the levels of these contaminants is below the MCLs. If the levels of nitrate or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with 310 CMR 22.06(9)(b) and (c), and compliance shall be determined based on the average of the initial and confirmation samples.

(d) Average Exceeding MCL: When the average of the four additional analyses made pursuant to 310 CMR 22.06(8)(c), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give public notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.

22.06: continued

(13) Sampling Schedules: Each public water system shall monitor at the time designated by the Department during each compliance period.

(14) Reporting MCL Violation: A system which exceeds the MCL listed in 310 CMR 22.06(2)(a) through (k) and is out of compliance shall report the exceedance to the Department within seven days.

(15) Analytical and Sampling Methods for Inorganics:

(a) Analytical Methods for IOCs: Analysis for the listed inorganic contaminants shall be conducted using the following methods:

INORGANIC CONTAMINANTS ANALYTICAL METHODS

Contaminant	Methodology	Reference (Method Number)			
		EPA ^{1,5,12}	ASTM ²	SM ³	Other
Antimony	Atomic Absorption: Furnace ⁶	¹		3113B	
	Atomic Absorption: platform ⁶	⁵			
	ICP-Mass Spectrometry ⁶	⁵ 200.8			
	Hydride-Atomic Absorption ⁹		D-3697-92		
Arsenic	Atomic Absorption: Furnace		D2972-93C	3113B	
	Atomic Absorption; Hydride		D-2972-93B	3114B	
	Inductively Coupled Plasma	⁵ 200.7		3120B	
	ICP-Mass Spectrometry	⁵ 200.8			
	Atomic Absorption; Platform	⁵ 200.9			
Asbestos	Transmission				
	Electron Microscopy	-- ¹² 100.1 ⁴ 100.2	--	--	
Barium	Atomic Absorption; Furnace		--	3113B	--
	Atomic Absorption: Direct ⁶		--	3111D	--
	Inductively Coupled Plasma ⁶	⁵ 200.7	--	3120B	--
	ICP-Mass Spectrometry	⁵ 200.8			
Beryllium	Atomic Absorption: Furnace ⁶		D-3645-93B		3113B
	Atomic Absorption: Platform ⁶	⁵ 200.9			
	Inductively Coupled Plasma ⁶	⁵ 200.7		3120B	
	ICP-Mass Spectrometry ⁶	⁵ 200.8			
Cadmium	Atomic absorption; Furnace ⁶		--	3113B	--
	Inductively-coupled Plasma ⁶	⁵ 200.7	--	--	--
	ICP-Mass Spectrometry	⁵ 200.8			
	Atomic Absorption; Platform	⁵ 200.9			
Chromium	Atomic absorption; Furnace ⁶		--	3113B	--
	Inductively Coupled Plasma ⁶	⁵ 200.7	--	3120B	--
	ICP-Mass Spectrometry	⁵ 200.8			
	Atomic Absorption; Platform	⁵ 200.9			
Cyanide	Manual Distillation			4500-CN-C	
	Manual Distillation followed by: Spectrophotometric, Amenable		D2036-91B	4500-CN-G	
	Manual Distillation followed by: Spectrophotometric, Manual		D2036-91A	4500-CN-E 1-3300-85 ¹⁵	
	Semi-automated	335.4 ¹¹			
	Selective Electrode			4500-CN-F	
Mercury	Manual cold vapor ⁹		D3223-91	3112B	--
	Automated cold vapor ⁹	¹ 245.2	--	--	--
	ICP-Mass Spectrometry	200.8 ⁵			

Contaminant	Methodology	Reference (Method Number)		SM ³	Other
		EPA ^{1 5 12}	ASTM ²		
Nickel	Atomic Absorption: Furnace ⁶			3113B	
	Atomic Absorption: Platform ⁶	⁵ 200.9			
	Atomic Absorption Direct ⁶			3111B	
	Inductively Coupled Plasma ⁶	⁵ 200.7		3120B	
	ICP-Mass Spectrometry ⁶	⁵ 200.8			
Nitrate	Manual cadmium reduction		D3867-90B	4500-NO ₃ -E	--
		--	--	--	
	Automated cadmium reduction	¹¹ 353.2	D3867-90A	4500-NO ₃ -F	--
	Ion selective electrode	--	--	4500-NO ₃ -D	601 ⁷
	Ion chromatography	¹¹ 300.0	D4327-91	4110B	B-101
Nitrite	Spectrophotometric		--	4500-NO ₂ -B	
	Automated cadmium reduction	¹¹ 353.2	D3867-90A	4500-NO ₃ -F	--
	Manual cadmium reduction		D3867-90B	4500-NO ₃ -E	--
	Ion chromatography	¹¹ 300.0	D4327-91	4110B	B-101
Selenium	Hydride-Atomic absorption: ⁹		D3859-93A	3114B	
	Atomic Absorption: Furnace ^{6 10}		D3859-93B	3113B	
	ICP-Mass Spectrometry	200.8 ⁵			
	Atomic Absorption; Platform	200.9 ⁵			
Thallium	Atomic absorption; Platform ⁶	⁵ 200.9			
	ICP-Mass Spectrometry ⁶	⁵ 200.8			

S))Q

- 22.06: continued

(b) Analytical Methods for Fluoride: Analyses for fluoride shall be conducted using the following methods:

<u>Methodology</u>	<u>Reference (Method Number)</u>			
	<u>EPA</u>	<u>ASTM¹</u>	<u>SM²</u>	<u>Other</u>
Ion Chromatography	300.0 ⁵	D4327-91	4110B	--
Manual Distillation:			4500F-B,D	
Colorimetric SPADNS				--
Manual Electrode		D1179-93B	4500F-C	
Automated Alizarin fluorine blue - lanthanum, with distillation (complexone)			4500F-E	129-71W ³
Automated ion selective electrode	--	--	--	380-75WE ⁴

1 - Annual Book of ASTM Standards, part 31 Water. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

2 - "Standard Methods for the Examination of Water and Wastewater." 18th Edition. American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1992.

3 - "Fluoride in Water and Wastewater, Industrial Method # 129-71W." Technicon Industrial Systems, Tarrytown, New York, 10591. December 1972.

4 - "Fluoride in Water and Wastewater." Technicon Industrial Systems, Tarrytown, New York, 10591. February 1976.

5 - "Methods for the Determination of Inorganic Substances in Environmental Samples." EPA-600/R-93/100. August 1993. Available at NTIS. PB94-121811.

(c) Sample Collection Methods for IOCs: Sample collection for antimony, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium and thallium under 310 CMR 22.06 shall be conducted using the sample preservation, container, and maximum holding time procedures specified in the table below:

<u>Contaminant</u>	<u>Preservative¹</u>	<u>Container²</u>	<u>Time³</u>
Antimony	Con HNO ₃ to pH<2	P or G	6 months
Asbestos	Cool, 4°C	P or G	--
Barium	Con HNO ₃ to pH<2	P or G	6 months
Beryllium	Con HNO ₃ to pH<2	P or G	6 months
Cadmium	Con HNO ₃ to pH<2	P or G	6 months
Chromium	Con HNO ₃ to pH<2	P or G	6 months
Cyanide	Cool, 4°C, NAOH to pH>12	P or G	14 days
Fluoride	None	P or G	1 month
Mercury	Con HNO ₃ to pH<2	P or G	28 days
Nickel	Conc HNO ₃	P or G	6 months
Nitrate			
Chlorinated	Cool, 4°C	P or G	48 days
Non-chlorinated	Con H ₂ SO ₄ to pH<2	P or G	14 days
Nitrite	Cool, 4°C	P or G	48 hours
Selenium	Con HNO ₃ to pH<2	P or G	6 months
Thallium	Con HNO ₃ to pH<2	P or G	6 months

1 - If HNO₃ cannot be used because of shipping restrictions, sample may be initially preserved by icing and immediately shipping it to the laboratory. Upon receipt in the laboratory, the sample must be acidified with conc HNO₃ to pH <2 and held for 16 hours before analysis.

2 - P = plastic, hard or soft; G = glass, hard or soft.

3 - In all cases, samples should be analyzed as soon after collection as possible.

4 - See method(s) for the information for preservation.

22.06: continued

(16) BATs for IOCs: The following are the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for inorganic contaminants identified in 310 CMR 22.06(2)(a) except fluoride:

BAT FOR INORGANIC CONTAMINANTS LISTED IN 310 CMR 22.06(2)

<u>CHEMICAL NAME</u>	<u>BAT(s)</u>
Antimony	2,7
Asbestos	2,3,8
Barium	5,6,7,9
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6 ² ,7
Cyanide	5,7,10
Mercury	2 ¹ ,4,6 ¹ ,7 ¹
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2 ³ ,6,7,9
Thallium	1,5

Key to BATs in Table

- 1 = Activated Alumina
- 2 = Coagulation/Filtration (Not BAT for Systems <500 service connections)
- 3 = Direct and Diatomite Filtration
- 4 = Granular Activated Carbon
- 5 = Ion Exchange Electrodialysis
- 6 = Lime Softening (not BAT for systems <500 service connections)
- 7 = Reverse Osmosis
- 8 = Corrosion Control
- 9 = Electrodialysis
- 10 = Chlorine
- 11 = Ultraviolet
- ¹BAT only if influent Hg concentrations $\leq 10 \mu\text{g/l}$.
- ²BAT for Chromium III only
- ³BAT for Selenium IV only

22.06A: Special Monitoring for Sodium. Reporting and Analytical Methods and Frequency

- (1) Monitoring: All public water systems (community and non-transient, non-community and non-community:) shall monitor for the determination of sodium concentration levels.
- (2) Initial Sampling Frequency: Each community and non-transient, non-community and transient community water system is required to monitor for sodium during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.
 - (a) GW Sampling Frequency: Groundwater systems shall take one sample at each sampling point during each compliance period beginning in the compliance period starting January 1, 1993, (once every three years).
 - (b) SW Sampling Frequency: Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point beginning January 1, 1993.
- (3) Sampling Protocol: Monitoring shall be conducted as follows:
 - (a) Ground Water Sampling Points: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point) beginning in the compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

22.06A: continued

(b) Surface Water Sampling Points: Surface water systems (Note: For purposes of 310 CMR 22.06A(3)(b), surface water systems include systems with a combination of surface and ground sources.) shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in the compliance period beginning January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources: If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

(4) Sodium Reporting: The supplier of water shall report to the Department the results of the analyses for sodium within the first ten days of the month following the month in which the sample results were received or within the first ten days following the end of the required monitoring period, whichever comes first.

(5) Sodium Notification: The supplier of water shall report the level of sodium for each source to the local Boards of Health and Massachusetts Department of Public Health by written notice by direct mail within 30 days after the supplier of water first learns of the analytic results which indicate a level of sodium.

(6) Sampling Schedules: Each public water system shall monitor at the time designated by the Department during each compliance period.

(7) Sodium Analysis Analytical Methods: Analysis for sodium shall be conducted using the following method:

SODIUM ANALYTICAL METHODS			
<u>Reference (Method Number)</u>			
<u>Contaminant</u>	<u>Methodology⁴</u>	<u>EPA¹</u>	<u>SM²</u>
Sodium	Inductively-coupled		
	Plasma	200.7	--
	Atomic absorption:		
	direct aspiration	--	3111B

1 - "Methods for the Determination of Metals in Environmental Samples - Supplement 1", EPA-600/r-94 111. May 1994. Available at NTIS. PB-184942.

2 - "Standard Methods for the Examination of Water and Wastewater," 18th edition, American Public Health Association. 1992.

3 - For approved analytical procedures for metals, the technique applicable to total metals must be used.

22.06B: Control of Lead and Copper in Drinking Water

(1) General Requirements.

(a) Applicability and effective dates.

1. The requirements of 310 CMR 22.06B constitute the Massachusetts drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of 310 CMR 22.06B applies to community water systems and non-transient, non-community water systems (hereinafter referred to as "water systems" or "systems").

2. The requirements set forth in 310 CMR 22.06B(7) to (12) shall take effect July 7, 1992. The requirements in 310 CMR 22.06B(1) to (6) shall take effect December 7, 1992.

(b) Scope. 310 CMR 22.06B establishes a treatment technique for lead and copper that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumers' taps.

22.06B: continued

(c) Lead and copper action levels:

1. The lead action level is exceeded if the concentration of lead in more than 10% of tap water samples collected during any monitoring period conducted in accordance with 310 CMR 22.06B(7) is greater than 0.015 mg/L (i.e., if the "90th percentile" lead level is greater than 0.015 mg/L).
2. The copper action level is exceeded if the concentration of copper in more than 10% of tap water samples collected during any monitoring period conducted in accordance with 310 CMR 22.06B(7) is greater than 1.3 mg/L (i.e., if the "90th percentile" copper level is greater than 1.3 mg/L).
3. The 90th percentile lead and copper levels shall be computed as follows:
 - a. The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.
 - b. The number of samples taken during the monitoring period shall be multiplied by 0.9.
 - c. The contaminant concentration in the numbered sample yielded by the calculation in 310 CMR 22.06B(1)(c)3.b. is the 90th percentile contaminant level.
 - d. For water systems serving fewer than 100 people that collect five samples per monitoring period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

(d) Corrosion control treatment requirements.

1. All water systems shall install and operate optimal corrosion control treatment as defined in 310 CMR 22.02.
2. Any water system that complies with the applicable corrosion control treatment requirements specified by the Department under 310 CMR 22.06B(2) and (3) shall be deemed in compliance with the treatment requirement contained in 310 CMR 22.06B(1)(d)1.

(e) Source water treatment requirements. Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the Department under 310 CMR 22.06B(4).

(f) Lead service line replacement requirements. Any system exceeding the lead action level after implementation of applicable corrosion control and source water treatment requirements shall complete the lead service line replacement requirements contained in 310 CMR 22.06B(5).

(g) Public education requirements. Any system exceeding the lead action level shall implement the public education requirements contained in 310 CMR 22.06B(6).

(h) Monitoring and analytical requirements. Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this subpart shall be completed in compliance with 310 CMR 22.06B(7) to (10).

(i) Reporting requirements. Systems shall report to the Department any information required by the treatment provisions of this subpart and 310 CMR 22.06B(11).

(j) Recordkeeping requirements. Systems shall maintain records in accordance with 310 CMR 22.06B(12).

(k) Violation of national primary drinking water regulations. Failure to comply with the applicable requirements of 310 CMR 22.06B(1) through (12), including requirements established by the Department pursuant to 310 CMR 22.00 shall constitute a violation of the national primary drinking water regulations for lead and/or copper.

(2) Applicability of corrosion control treatment steps to small, medium-size and large water systems.

(a) Systems shall complete the applicable corrosion control treatment requirements described in 310 CMR 22.06B(3) by the deadlines established in 310 CMR 22.06B.

1. A large system (serving >50,000 persons) shall complete the corrosion control treatment steps specified in 310 CMR 22.06B(2)(d), unless it is deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)2. or (b)3.

22.06B: continued

2. A small system (serving ≤ 3300 persons) and a medium size system (serving > 3300 and $\leq 50,000$ persons) shall complete the corrosion control treatment steps specified in 310 CMR 22.06B(2)(e), unless it is deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)1., (b)2., or (b)3.
- (b) A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in 310 CMR 22.06B if the system satisfies one of the following criteria:
1. A small or medium-size water system is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods conducted in accordance with 310 CMR 22.06B(7).
 2. Any water system may be deemed by the Department to have optimized corrosion control treatment if the system demonstrates to the satisfaction of the Department that it has conducted activities equivalent to the corrosion control steps applicable to such system under 310 CMR 22.06B. If the Department makes this determination, it shall provide the system with written notice explaining the basis for its decision and shall specify the water quality control parameters representing optimal corrosion control in accordance with 310 CMR 22.06B(3)(f). A system shall provide the Department with the following information in order to support a determination under 310 CMR 22.06B(2)(b)2.:
 - a. the results of all test samples collected for each of the water quality parameters in 310 CMR 22.06B(3)(c)3.
 - b. a report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in 310 CMR 22.06B(3)(c)1., the results of all tests conducted, and the basis for the system's selection of optimal corrosion control treatment;
 - c. a report explaining how corrosion control has been installed and how it is being maintained to insure minimal lead and copper concentrations at consumers' taps; and
 - d. the results of tap water samples collected in accordance with 310 CMR 22.06B(7) at least once every six months for one year after corrosion control has been installed.
 3. Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with 310 CMR 22.06B(7) and source water monitoring conducted in accordance with 310 CMR 22.06B(9) that demonstrates for two consecutive six-month monitoring periods that the difference between the 90th percentile tap water lead level computed under 310 CMR 22.06B(1)(c)3. and the highest source water lead concentration, is less than the Practical Quantitation Level for lead specified in 310 CMR 22.06B(10)(a)1.b.
- (c) Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to 310 CMR 22.06B(7) and submits the results to the Department. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system (or the Department, as the case may be) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The Department may require a system to repeat treatment steps previously completed by the system where the Department determines that this is necessary to implement properly the treatment requirements of 310 CMR 22.06B. The Department shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small or medium size system to implement corrosion control treatment steps in accordance with 310 CMR 22.06B(2)(e) (including systems deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)1)) is triggered whenever any small-or medium-sized system exceeds the lead or copper action level.
- (d) Treatment steps and deadlines for large systems. Except as provided in 310 CMR 22.06B(2)(b)2. and 3., large systems shall complete the following corrosion control treatment steps (described in the referenced portions of 310 CMR 22.06B(3), (7), and (8)) by the indicated dates.

22.06B: continued

1. Step 1: The system shall conduct initial monitoring as specified in 310 CMR 22.06B(7)(d)1 and 310 CMR 22.06B(8)(b) during two consecutive six-month monitoring periods by January 1, 1993.
 2. Step 2: The system shall complete corrosion control studies (310 CMR 22.06B(3)(c)) by July 1, 1994.
 3. Step 3: The Department shall designate optimal corrosion control treatment (310 CMR 22.06B(3)(d)) by January 1, 1995.
 4. Step 4: The system shall install optimal corrosion control treatment (310 CMR 22.06B(3)(e)) by January 1, 1997.
 5. Step 5: The system shall complete follow-up sampling (310 CMR 22.06B(7)(d)2. and 310 CMR 22.06B(8)(c)) by January 1, 1998.
 6. Step 6: The Department shall review installation of treatment and designate optimal water quality control parameters (310 CMR 22.06B(3)(f)) by July 1, 1998.
 7. Step 7: The system shall operate in compliance with the Department-specified optimal water quality control parameters (310 CMR 22.06B(3)(g)) and continue to conduct tap sampling (310 CMR 22.06B(7)(d)3 and 310 CMR 22.06B(8)(d)).
- (e) Treatment steps and deadlines for small and medium-size systems. Except as provided in 310 CMR 22.06B(2)(b), small and medium-size systems shall complete the following corrosion control treatment steps (described in the referenced portions of 310 CMR 22.06B(3), 310 CMR 22.06B(7), and 310 CMR 22.06B(8)) by the indicated time periods.
1. Step 1: The system shall conduct initial tap sampling (310 CMR 22.06B(7)(d)1. and 310 CMR 22.06B(8)(b)) until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under 310 CMR 22.06B(7)(d)4. A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment (310 CMR 22.06B(3)(a)) within six months after the end of the monitoring period during which it exceeds one of the action levels.
 2. Step 2: Within 12 months after the end of a monitoring period during which a system exceeds the lead or copper action level, the Department may require the system to perform corrosion control studies (310 CMR 22.06B(3)(b)). If the Department does not require the system to perform such studies, the Department shall specify optimal corrosion control treatment (310 CMR 22.06B(3)(d)) within the following timeframes:
 - a. for medium-size systems, within 18 months after such system exceeds the lead or copper action level,
 - b. for small systems, within 24 months after such system exceeds the lead or copper action level.
 3. Step 3: If the Department requires a system to perform corrosion control studies under step 2, the system shall complete the studies (310 CMR 22.06B(3)(c)) within 18 months after the Department requires that such studies be conducted.
 4. Step 4: If the system has performed corrosion control studies under step 2, the Department shall designate optimal corrosion control treatment (310 CMR 22.06B(3)(d)) within six months after completion of step 3.
 5. Step 5: The system shall install optimal corrosion control treatment (310 CMR 22.06B(3)(e)) within 24 months after the Department designates such treatment.
 6. Step 6: The system shall complete follow-up sampling (310 CMR 22.06B(7)(d)2 and 310 CMR 22.06B(8)(c)) within 36 months after the Department designates optimal corrosion control treatment.
 7. Step 7: The Department shall review the system's installation of treatment and designate optimal water quality control parameters (310 CMR 22.06B(3)(f)) within 6 months after completion of step 6.
 8. Step 8: The system shall operate in compliance with the Department-designated optimal water quality control parameters (310 CMR 22.06B(3)(g)) and continue to conduct tap sampling (310 CMR 22.06B(7)(d)3. and 310 CMR 11.05B(8)(d)).

- (3) Description of corrosion control treatment requirements. Each system shall complete the corrosion control treatment requirements described below which are applicable to such system under 310 CMR 22.06B(2).

22.06B: continued

- (a) System recommendation regarding corrosion control treatment. Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, small and medium-size water systems exceeding the lead or copper action level shall recommend installation of one or more of the corrosion control treatments listed in 310 CMR 22.06B(3)(c)1. which the system believes constitutes optimal corrosion control for that system. The Department may require the system to conduct additional water quality parameter monitoring in accordance with 310 CMR 22.06B(8)(b) to assist the Department in reviewing the system's recommendation.
- (b) Department decision to require studies of corrosion control treatment (applicable to small and medium-size systems). The Department may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under 310 CMR 22.06B(2)(c) to identify optimal corrosion control treatment for the system.
- (c) Performance of corrosion control studies.
 - 1. Any public water system performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that system:
 - a. alkalinity and pH adjustment;
 - b. calcium hardness adjustment; and
 - c. the addition of a phosphate or silicate based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.
 - 2. The water system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, metal coupon tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry and distribution system configuration.
 - 3. The water system shall measure the following water quality parameters in any tests conducted under 310 CMR 22.06B(3)(c)3. before and after evaluating the corrosion control treatments listed above:
 - a. lead;
 - b. copper;
 - c. pH;
 - d. alkalinity;
 - e. calcium;
 - f. conductivity;
 - g. orthophosphate (when an inhibitor containing a phosphate compound is used);
 - h. silicate (when an inhibitor containing a silicate compound is used);
 - i. water temperature.
 - 4. The water system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document such constraints with at least one of the following:
 - a. data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics; and/or
 - b. data and documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes.
 - 5. The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.
 - 6. On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the Department in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in 310 CMR 22.06B(3)(c)1. through 5.

22.06B: continued

(d) Department designation of optimal corrosion control treatment.

1. Based upon consideration of available information including, where applicable, studies performed under 310 CMR 22.06B(3)(c) and a system's recommended treatment alternative, the Department shall either approve the corrosion control treatment option recommended by the system, or designate alternative corrosion control treatment(s) from among those listed in 310 CMR 22.06B(3)(c)1. When designating optimal treatment the Department shall consider the effects that additional corrosion control treatment may have on water quality parameters and on other water quality treatment processes.

2. The Department shall notify the system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination. If the Department requests additional information to aid its review, the water system shall provide the information.

(e) Installation of optimal corrosion control. Each system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the Department under 310 CMR 22.06B(3)(d).

(f) Department review of treatment and specification of optimal water quality control parameters. The Department shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated by the Department in 310 CMR 22.06B(3)(d). Upon reviewing the results of tap water and water quality parameter monitoring by the system, both before and after the system installs optimal corrosion control treatment, the Department shall designate:

1. a minimum value or a range of values for pH measured at each entry point to the distribution system;

2. a minimum pH value, measured in all tap samples. Such value shall be equal to or greater than 7.0, unless the Department determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

3. if a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Department determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system;

4. if alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

5. if calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples. The values for the applicable water quality control parameters listed above shall be those that the Department determines to reflect optimal corrosion control treatment for the system. The Department may designate values for additional water quality control parameters determined by the Department to reflect optimal corrosion control for the system. The Department shall notify the system in writing of these determinations and explain the basis for its decisions.

(g) Continued Operation and Monitoring. All systems shall maintain water quality parameter values at or above minimum values or within ranges designated by the Department under 310 CMR 22.06B(3)(f) in each sample collected under 310 CMR 22.06B(8)(d). If the water quality parameter value of any sample is below the minimum value or outside the range designated by the Department, then the system is out of compliance with 310 CMR 22.06B(3)(g). As specified in 310 CMR 22.06B(8)(d), the system may take a confirmation sample for any water quality parameter value no later than three days after the first sample. If a confirmation sample is taken, the result must be averaged with the first sampling result and the average must be used for any compliance determinations under 310 CMR 22.06B(3)(g). The Department has the discretion to delete results of obvious sampling errors from this calculation.

22.06B: continued

(h) Modification of Department treatment decisions. Upon its own initiative or in response to a reasonable request by a water system or other interested party, the Department may modify its determination of the optimal corrosion control treatment under 310 CMR 22.06B(3)(d) or optimal water quality control parameters under 310 CMR 22.06B(3)(d)(f). A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The Department may modify its determination where it concludes that such change is necessary to ensure that the system continues to optimize corrosion control treatment. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the Department's decision, and provide an implementation schedule for completing the treatment modifications.

(4) Source water treatment requirements. Systems shall complete the applicable source water monitoring and treatment requirements (described in the referenced portions of 310 CMR 22.06B(3)(b), and in 310 CMR 22.06B(7) and (9)) by the following deadlines.

(a) Deadlines for Completing Source Water Treatment Steps.

1. Step 1: A system exceeding the lead or copper action level shall complete lead and copper source water monitoring (310 CMR 22.06B(9)(b)) and make a treatment recommendation to the Department (310 CMR 22.06B(4)(b)1.) within six months after exceeding the lead or copper action level.

2. Step 2: The Department shall make a determination regarding source water treatment (310 CMR 22.06B(4)(b)2.) within six months after submission of monitoring results under Step 1.

3. Step 3: If the Department requires installation of source water treatment, the system shall install the treatment (310 CMR 22.06B(4)(b)3.) within 24 months after completion of Step 2.

4. Step 4: The system shall complete follow-up tap water monitoring (310 CMR 22.06B(7)(d)2.) and source water monitoring (310 CMR 22.06B(9)(c)) within 36 months after completion of Step 2.

5. Step 5: The Department shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels (310 CMR 22.06B(4)(b)4.) within six months after completion of step 4.

6. Step 6: The system shall operate in compliance with the Department-specified maximum permissible lead and copper source water levels (310 CMR 22.06B(4)(b)4.) and continue source water monitoring (310 CMR 22.06B(9)(d)).

(b) Description of Source Water Treatment Requirements.

1. System treatment recommendation. Any system which exceeds the lead or copper action level shall recommend in writing to the Department the installation and operation of one of the source water treatments listed in 310 CMR 22.06B(4)(b)2. A system may recommend that no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

2. Department determination regarding source water treatment. The Department shall complete an evaluation of the results of all source water samples submitted by the water system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps. If the Department determines that treatment is needed, the Department shall either require installation and operation of the source water treatment recommended by the system (if any) or require the installation and operation of another source water treatment from among the following: ion exchange, reverse osmosis, lime softening or coagulation/filtration. If the Department requests additional information to aid in its review, the water system shall provide the information by the date specified by the Department in its request. The Department shall notify the system in writing of its determination and set forth the basis for its decision.

3. Installation of source water treatment. Each system shall properly install and operate the source water treatment designated by the Department under 310 CMR 22.06B(4)(b)2.

22.06B: continued

4. Department review of source water treatment and specification of maximum permissible source water levels. The Department shall review the source water sample analysis taken by the water system both before and after the system installs source water treatment, and determine whether the system has properly installed and operated the source water treatment designated by the Department. Based upon its review, the Department shall designate the maximum permissible lead and copper concentrations for finished water entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The Department shall notify the system in writing and explain the basis for its decision.
 5. Continued operation and maintenance. Each water system shall maintain source water lead and copper levels below 0.005 mg/L and 0.5 mg/L respectively at each sampling point monitored in accordance with 310 CMR 22.06B(9). The system is out of compliance with 310 CMR 22.06B(9), if the level of lead or copper at any source water sampling point is greater than 0.005 mg/L for lead or 0.5 mg/L for copper.
 6. Modification of Department treatment decisions. Upon its own initiative or in response to a request by a water system or other interested party, the Department may modify its determination of the source water treatment under 310 CMR 22.06B(4)(b)2., or maximum permissible lead and copper concentrations for finished water entering the distribution system under 310 CMR 22.06B(4)(b)4. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The Department may modify its determination where it concludes that such change is necessary to ensure that the system continues to minimize lead and copper concentrations in source water. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the Department's decision, and provide an implementation schedule for completing the treatment modifications.
- (5) Lead service line replacement requirements.
- (a) Systems that fail to meet the lead action level in tap samples taken pursuant to 310 CMR 22.06B(7)(d)2., after installing corrosion control and/or source water treatment (whichever sampling occurs later), shall replace lead service lines in accordance with the requirements of 310 CMR 22.06B(5). If a system is in violation of 310 CMR 22.06B(2) or (4) for failure to install source water or corrosion control treatment, the Department may require the system to commence lead service line replacement under 310 CMR 22.06B(5) after the date by which the system was required to conduct monitoring under 310 CMR 22.06B(7)(d)2. has passed.
 - (b) A system shall replace annually at least 7% of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The system shall identify the initial number of lead service lines in its distribution system based upon a materials evaluation, including the evaluation required under 310 CMR 22.06B(7)(a). The first year of lead service line replacement shall begin on the date the action level was exceeded in tap sampling referenced in 310 CMR 22.06B(5)(a).
 - (c) A system is not required to replace an individual lead service line if the lead concentration in all service line samples from that line, taken pursuant to 310 CMR 22.06B(7)(b)3. is less than or equal to 0.015 mg/L.
 - (d) A water system shall replace the entire service line (up to the building inlet) unless it demonstrates to the satisfaction of the Department under 310 CMR 22.06B(5)(e) that it controls less than the entire service line. In such cases, the system shall replace the portion of the line which the Department determines is under the system's control. The system shall notify the user served by the line that the system will replace the portion of the service line under its control and shall offer to replace the building owner's portion of the line, but is not required to bear the cost of replacing the building owner's portion of the line. For buildings where only a portion of the lead service line is replaced, the water system shall inform the resident(s) that the system will collect a first flush tap water sample after partial replacement of the service line is completed if the resident(s) so desire. In cases where the resident(s) accept the offer, the system shall collect the sample and report the results to the resident(s) within 14 days following partial lead service line replacement.

22.06B: continued

(e) A water system is presumed to control the entire lead service line (up to the building inlet) unless the system demonstrates to the satisfaction of the Department, in a letter submitted under 310 CMR 22.06B(10)(e)4., that it does not have any of the following forms of control over the entire line (as defined by state statutes, municipal ordinances, public service contracts or other applicable legal authority): authority to set standards for construction, repair, or maintenance of the line, authority to replace, repair, or maintain the service line, or ownership of the service line. The Department shall review the information supplied by the system and determine whether the system controls less than the entire service line and, in such cases, shall determine the extent of the system's control. The Department's determination shall be in writing and explain the basis for its decision.

(f) The Department shall require a system to replace lead service lines on a shorter schedule than that required by 310 CMR 22.06B(5), taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The Department shall make this determination in writing and notify the system of its finding within six months after the system is triggered into lead service line replacement based on monitoring referenced in 310 CMR 22.06B(5)(a).

(g) Any system may cease replacing lead service lines whenever first draw samples collected pursuant to 310 CMR 22.06B(7)(d)3. meet the lead action level during each of two consecutive monitoring periods and the system submits the results to the Department. If first draw samples collected in any such water system thereafter exceeds the lead action level, the system shall recommence replacing lead service lines, pursuant to 310 CMR 22.06B(5)(b).

(h) To demonstrate compliance with 310 CMR 22.06B(5)(a) through (d), a system shall report to the Department the information specified in 310 CMR 22.06B(10)(e).

(6) Public education and supplemental monitoring requirements. A water system that exceeds the lead action level based on tap water samples collected in accordance with 310 CMR 22.06B(7) shall deliver the public education materials contained in 310 CMR 22.06B(6)(a) and (b) in accordance with the requirements in 310 CMR 22.06B(6)(c).

(a) Content of written materials. A water system shall include the following text in all of the printed materials it distributes through its lead public education program. Any additional information presented by a system shall be consistent with the information below and be in plain English that can be understood by laypersons.

1. Introduction. The United States Environmental Protection Agency (EPA) and (insert name of water supplier) are concerned about lead in your drinking water. Although most homes have very low levels of lead in their drinking water, some homes in the community have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under Federal law we are required to have a program in place to minimize lead in your drinking water by (insert date when corrosion control will be completed for your system). This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace each lead service line that we control if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead regulation please give us a call at (insert water system's phone number). This brochure explains the simple steps you can take to protect you and your family by reducing your exposure to lead in drinking water.

2. Health Effects of Lead. Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery porcelain and pewter, and water. Lead can pose a significant risk to your health if too much of it enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes into contact with sources of lead contamination -- like dirt and dust -- that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths.

22.06B: continued

3. Lead in Drinking Water.

a. Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20% or more of a person's total exposure to lead.

b. Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead-based solder used to join copper pipe, brass and chrome plated brass faucets, and in some cases, pipes made of lead that connect your house to the water main (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%.

c. When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon after returning from work or school, can contain fairly high levels of lead.

4. Steps You Can Take in the Home to Reduce Exposure to Lead in Drinking Water.

a. Despite our best efforts mentioned earlier to control water corrosivity and remove lead from the water supply, lead levels in some homes or buildings can be high. To find out whether you need to take action in your own home, have your drinking water tested to determine if it contains excessive concentrations of lead. Testing the water is essential because you cannot see, taste, or smell lead in drinking water. Some local laboratories that can provide this service are listed at the end of this booklet. For more information on having your water tested, please call (insert phone number of water system).

b. If a water test indicates that the drinking water drawn from a tap in your home contains lead above 15 ppb, then you should take the following precautions:

(i) Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water resides in your home's plumbing the more lead it may contain. Flushing the tap means running the cold water faucet until the water gets noticeably colder, usually about 15-30 seconds. If your house has a lead service line to the water main, you may have to flush the water for a longer time, perhaps one minute, before drinking. Although toilet flushing or showering flushes water through a portion of your home's plumbing system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your family's health. It usually uses less than one or two gallons of water and costs less than (insert a cost estimate based on flushing two times a day for 30 days) per month. To conserve water, fill a couple of bottles for drinking water after flushing the tap, and whenever possible use the first flush water to wash the dishes or water the plants. If you live in a high-rise building, letting the water flow before using it may not work to lessen your risk from lead. The plumbing systems have more, and sometimes larger pipes than smaller buildings. Ask your landlord for help in locating the source of the lead and for advice on reducing the lead level.

(ii) Try not to cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw water from the cold tap and heat it on the stove.

(iii) Remove loose lead solder and debris from the plumbing materials installed in newly constructed homes, or homes in which the plumbing has recently been replaced, by removing the faucet strainers from all taps and running the water from three to five minutes. Thereafter, periodically remove the strainers and flush out any debris that has accumulated over time.

22.06B: continued

(iv) If your copper pipes are joined with lead solder that has been installed illegally since it was banned in 1986, notify the plumber who did the work and request that he or she replace the lead solder with lead-free solder. Lead solder looks dull gray, and when scratched with a key looks shiny. In addition, notify the Department of Environmental Protection about the violation.

(v) Determine whether or not the service line that connects your home or apartment to the water main is made of lead. The best way to determine if your service line is made of lead is by either hiring a licensed plumber to inspect the line or by contacting the plumbing contractor who installed the line. You can identify the plumbing contractor by checking the city's record of building permits which should be maintained in the files of the (insert name of department that issues building permits). A licensed plumber can at the same time check to see if your home's plumbing contains lead solder, lead pipes, or pipe fittings that contain lead. The public water system that delivers water to your home should also maintain records of the materials located in the distribution system. If the service line that connects your dwelling to the water main contributes more than 15 ppb to drinking water, after our comprehensive treatment program is in place, we are required to replace the line. If the line is only partially controlled by the (insert name of the city, county, or water system that controls the line), we are required to provide you with information on how to replace your portion of the service line, and offer to replace that portion of the line at your expense and take a follow-up tap water sample within 14 days of the replacement. Acceptable replacement alternatives include copper, steel, iron, and plastic pipes.

(vi) Have an electrician check your wiring. If grounding wires from the electrical system are attached to your pipes, corrosion may be greater. Check with a licensed electrician or your local electrical code to determine if your wiring can be grounded elsewhere. DO NOT attempt to change the wiring yourself because improper grounding can cause electrical shock and fire hazards.

c. The steps described above will reduce the lead concentrations in your drinking water. However, if a water test indicates that the drinking water coming from your tap contains lead concentrations in excess of 15 ppb after flushing, or after we have completed our actions to minimize lead levels, then you may want to take the following additional measures:

(i) Purchase or lease a home treatment device. Home treatment devices are limited in that each unit treats only the water that flows from the faucet to which it is connected, and all of the devices require periodic maintenance and replacement. Devices such as reverse osmosis systems or distillers can effectively remove lead from your drinking water. Some activated carbon filters may reduce lead levels at the tap, however all lead reduction claims should be investigated. Be sure to check the actual performance of a specific home treatment device before and after installing the unit.

(ii) Purchase bottled water for drinking and cooking.

d. You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. Department and local government agencies that can be contacted include:

(i) (insert the name of city or county department of public utilities) at (insert phone number) can provide you with information about your community's water supply, and a list of local laboratories that have been certified by EPA for testing water quality;

(ii) (insert the name of city or county department that issues building permits) at (insert phone number) can provide you with information about building permit records that should contain the names of plumbing contractors that plumbed your home; and

(iii) (insert the name of the Department of Public Health) at (insert phone number) or the (insert the name of the city or county health department) at (insert phone number) can provide you with information about the health effects of lead and how you can have your child's blood tested.

22.06B: continued

e. The following is a list of some Department approved laboratories in your area that you can call to have your water tested for lead. (Insert names and phone numbers of at least two laboratories).

(b) Content of broadcast materials. A water system shall include the following information in all public service announcements submitted under its lead public education program to television and radio stations for broadcasting:

1. Why should everyone want to know the facts about lead and drinking water? Because unhealthy amounts of lead can enter drinking water through the plumbing in your home. That's why I urge you to do what I did. I had my water tested for (insert free or \$ per sample). You can contact the (insert the name of the city or water system) for information on testing and on simple ways to reduce your exposure to lead in drinking water.

2. To have your water tested for lead, or to get more information about this public health concern, please call (insert the phone number of the city or water system).

(c) Delivery of a public education program.

1. In communities where a significant proportion of the population speaks a language other than English, public education materials shall be communicated in the appropriate language(s).

2. A community water system that fails to meet the lead action level on the basis of tap water samples collected in accordance with 310 CMR 22.06B(7) shall, within 60 days:

a. insert notices in each customer's water utility bill containing the information in 310 CMR 22.06B(6)(a), along with the following alert on the water bill itself in large print: "SOME HOMES IN THIS COMMUNITY HAVE ELEVATED LEAD LEVELS IN THEIR DRINKING WATER. LEAD CAN POSE A SIGNIFICANT RISK TO YOUR HEALTH. PLEASE READ THE ENCLOSED NOTICE FOR FURTHER INFORMATION."

b. submit the information in 310 CMR 22.06B(6)(a) to the editorial departments of the major daily and weekly newspapers circulated throughout the community.

c. deliver pamphlets and/or brochures that contain the public education materials in 310 CMR 22.06B(6)(a)2. and 4. to facilities and organizations, including the following:

- (i) public schools and/or local school boards;
- (ii) city or county health department;
- (iii) Women, Infants, and Children and/or Head Start Program(s) whenever available;
- (iv) public and private hospitals and/or clinics;
- (v) pediatricians;
- (vi) family planning clinics; and
- (vii) local welfare agencies.

d. submit the public service announcement in 310 CMR 22.06B(6)(b) to at least five of the radio and television stations with the largest audiences that broadcast to the community served by the water system.

3. A community water system shall repeat the tasks contained in 310 CMR 22.06B(6)(c)2.a., b., and c. every 12 months, and the tasks contained in 310 CMR 22.06B(6)(c)2.d. every six months for as long as the system exceeds the lead action level.

4. Within 60 days after it exceeds the lead action level, a non-transient non-community water system shall deliver the public education materials contained in 310 CMR 22.06B(6)(a)1., 2., and 4. as follows:

- a. post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system; and
- b. distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system.

5. A non-transient noncommunity water system shall repeat the tasks contained in 310 CMR 22.06B(6)(c)4. at least once during each calendar year in which the system exceeds the lead action level.

22.06B: continued

6. A water system may discontinue delivery of public education materials if the system has met the lead action level during the most recent six-month monitoring period conducted pursuant to 310 CMR 22.06B(7). Such a system shall recommence public education in accordance with 310 CMR 22.06B if it subsequently exceeds the lead action level during any monitoring period.

(d) Supplemental monitoring and notification of results.

1. A water system that fails to meet the lead action level on the basis of tap samples collected in accordance with 310 CMR 22.06B(7) shall offer to sample the tap water of any customer who requests it. The system is not required to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.

(7) Monitoring requirements for lead and copper in tap water.

(a) Sample site location.

1. By the applicable date for commencement of monitoring under 310 CMR 22.06B(7)(d)1., each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of 310 CMR 22.06B(7), and which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in 310 CMR 22.06B(7)(c). All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants. Once the sampling sites are selected they must be submitted to the Department on the required form for approval.

2. A water system shall use the information on lead, copper, and galvanized steel that it is required to collect under 310 CMR 22.19(5)(6)(7) of this part [special monitoring for corrosivity characteristics] when conducting a materials evaluation. When an evaluation of the information collected pursuant to 310 CMR 22.19(5)(6)(7) is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in 310 CMR 22.06B(7)(a), the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites. In addition, the system shall seek to collect such information where possible in the course of its normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities):

- a. all plumbing codes, permits, and records in the files of the building department(s) which indicate the plumbing materials that are installed within publicly and privately owned structures connected to the distribution system;
- b. all inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system; and
- c. all existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.

3. The sampling sites selected for a community water system's sampling pool ("tier 1 sampling sites") shall consist of single family structures that:

- a. contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or
- b. are served by a lead service line. When multiple-family residences comprise at least 20% of the structures served by a water system, the system may include these types of structures in its sampling pool.

4. Any community water system with insufficient tier 1 sampling sites shall complete its sampling pool with "tier 2 sampling sites", consisting of buildings, including multiple-family residences that:

- a. contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or
- b. are served by a lead service line.

5. Any community water system with insufficient tier 1 and tier 2 sampling sites shall complete its sampling pool with "tier 3 sampling sites", consisting of single family structures that contain copper pipes with lead solder installed before 1983.

22.06B: continued

6. The sampling sites selected for a non-transient non-community water system ("tier 1 sampling sites") shall consist of buildings that:
 - a. contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or
 - b. are served by a lead service line.
7. A non-transient non-community water system with insufficient tier 1 sites that meet the targeting criteria in 310 CMR 22.06B(7)(a)6. shall complete its sampling pool with sampling sites that contain copper pipes with lead solder installed before 1983.
8. Any water system whose sampling pool does not consist exclusively of tier 1 sites shall demonstrate in a letter submitted to the Department under 310 CMR 22.06B(10)(a)2. why a review of the information listed in 310 CMR 22.06B(7)(a)2. was inadequate to locate a sufficient number of tier 1 sites. Any community water system which includes tier 3 sampling sites in its sampling pool shall demonstrate in such a letter why it was unable to locate a sufficient number of tier 1 and tier 2 sampling sites.
9. Any water system whose distribution system contains lead service lines shall draw 50% of the samples it collects during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50% of the samples from sites served by a lead service line. A water system that cannot identify a sufficient number of sampling sites served by a lead service line shall demonstrate in a letter submitted to the Department under 310 CMR 22.06B(11)(a)4. why the system was unable to locate a sufficient number of such sites. Such a water system shall collect first draw samples from all of the sites identified as being served by such lines.
10. In addition to the samples required by 310 CMR 22.06B(7) the Department requires community water supplies to collect lead and copper samples from at least two schools. Each school will have two sampling sites from which a 250 ml sample will be taken, one from a kitchen tap and one from a drinking water source such as a water fountain.

(b) Sample collection methods.

1. All tap samples for lead and copper collected in accordance with this subpart, with the exception of lead service line samples collected under 310 CMR 22.06B(5)(c) to determine whether or not a lead service line should be replaced, shall be first draw samples.
2. Each first-draw tap sample for lead and copper shall be one liter and have stood motionless in the plumbing system of each sampling site for at least six hours. First draw samples from residential housing shall be collected from the cold-water kitchen tap or bathroom sink tap. First-draw samples from a non-residential building shall be collected at an interior tap from which water is typically drawn for consumption. First draw samples may be collected by the system or the system may allow residents to collect first draw samples after instructing the residents of the sampling procedures specified in 310 CMR 22.06B(7)(b)2. To avoid potential problems of residents handling nitric acid, acidification of first draw samples may be done up to 14 days after the sample has been collected. If the sample is not acidified immediately after collection, then the sample must stand in the original container for at least 28 hours after acidification. If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.
3. Each lead service line sample shall be one liter in volume and have stood motionless in the lead service line for at least six hours. Lead service line samples, for the purpose of determining whether or not a line should be replaced, shall be collected in one of the following three ways:
 - a. at the tap after flushing the volume of water between the tap and the lead service line. The volume of water shall be calculated based on the interior diameter and length of the pipe between the tap and the lead service line;
 - b. tapping directly into the lead service line; or
 - c. if the sampling site is a building constructed as a single-family residence, allowing the water to run until there is a significant change in temperature which would be indicative of water that has been standing in the lead service line.

22.06B: continued

4. A water system shall collect each first draw tap sample from the same sampling site from which it collected a previous sample. If, for any reason, the water system cannot gain entry to a sampling site in order to collect a follow-up tap sample, the system may collect the follow-up tap sample from another sampling site in its sampling pool as long as the new site meets the same targeting criteria, and is within reasonable proximity of the original site.

(c) Number of samples. Water systems shall collect at least one sample during each monitoring period specified in 310 CMR 22.06B(7)(d) from the number of sites listed in the first column below ("standard monitoring"). A system conducting reduced monitoring under 310 CMR 22.06B(7)(d)4. may collect one sample from the number of sites specified in the second column below specified in 310 CMR 22.06B(7)(d)4.

<u>System Size (# People Served)</u>	<u># of sites (Standard Monitoring)</u>	<u># of sites (Reduced Monitoring)</u>
>100,000	100	50
10,001-100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
<100	5	5

(d) Timing of monitoring

1. Initial tap sampling. The first six-month monitoring period for small, medium-size and large systems shall begin on the following dates:

<u>System Size (# People Served)</u>	<u>First six-month Monitoring Period Begins On</u>
>50,000	January 1, 1992
3,301 to 50,000	July 1, 1992
<3,300	July 1, 1993

a. All large systems shall monitor during two consecutive six-month periods.

b. All small and medium-size systems shall monitor during each six-month monitoring period until:

(i) the system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements under 310 CMR 22.06B(2), in which case the system shall continue monitoring in accordance with 310 CMR 22.06B(7)(d)2.. or

(ii) the system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with 310 CMR 22.06B(7)(d)4.

2. Monitoring after installation of corrosion control and source water treatment.

a. Any large system which installs optimal corrosion control treatment pursuant to 310 CMR 22.06B(2)(d)4. shall monitor during two consecutive six-month monitoring periods by the date specified in 310 CMR 22.06B(2)(d)5.

b. Any small or medium-size system which installs optimal corrosion control treatment pursuant to 310 CMR 22.06B(2)(e)5. shall monitor during two consecutive six-month monitoring periods by the date specified in 310 CMR 22.06B(2)(e)6.

c. Any system which installs source water treatment pursuant to 310 CMR 22.06B(4)(a)3. shall monitor during two consecutive six-month monitoring periods by the date specified in 310 CMR 22.06B(4)(a)4.

3. Monitoring after Department specifies water quality parameter values for optimal corrosion control. After the Department specifies the values for water quality control parameters under 310 CMR 22.06(3)(f), the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the Department specifies the optimal values under 310 CMR 22.06B(3)(f).

22.06B: continued

4. Reduced monitoring.

a. A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with 310 CMR 22.06B(7)(c), and reduce the frequency of sampling to once per year.

b. Any water system that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f) during each of two consecutive six-month monitoring periods may request that the Department allow the system to reduce the frequency of monitoring to once per year and to reduce the number of lead and copper samples in accordance with 310 CMR 22.06B(7)(c). The Department shall review the information submitted by the water system and shall make its decision in writing, setting forth the basis for its determination. The Department shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

c. A small or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water system that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f) during three consecutive years of monitoring may request that the Department allow the system to reduce the frequency of monitoring from annually to once every three years. The Department shall review the information submitted by the water system and shall make its decision in writing, setting forth the

basis for its determination. The Department shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

d. A water system that reduces the number and frequency of sampling shall collect these samples from sites included in the pool of targeted sampling sites identified in 310 CMR 22.06B(7)(a). Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August or September.

e. A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance with 310 CMR 22.06B(7)(c) and collect the number of samples specified for standard monitoring under 310 CMR 22.06B(7)(c). Such system shall also conduct water quality parameter monitoring in accordance with 310 CMR 22.06B(8)(b), (c) or (d) (as appropriate) during the monitoring period in which it exceeded the action level. Any water system subject to reduced monitoring frequency that fails to operate within the range of values for the water quality control parameters specified by the Department under 310 CMR 22.06B(3)(f) shall resume tap water sampling in accordance with 310 CMR 22.06B(7)(d)3. and collect the number of samples specified for standard monitoring under 310 CMR 22.06B(7)(c).

(e) Additional monitoring by systems. The results of any monitoring conducted in addition to the minimum requirements of 310 CMR 22.06B shall be considered by the system and the Department in making any determinations (i.e., calculating the 90th percentile lead or copper level) under this subpart.

(8) Monitoring requirements for water quality parameters. All large water systems and all small and medium-size systems that exceed the lead or copper action level shall monitor water quality parameters in addition to lead and copper in accordance with 310 CMR 22.06B(8). The requirements of 310 CMR 22.06B(8) are summarized in the table at the end of 310 CMR 22.06B(8).

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(a) General Requirements.1. Sample collection methods.

a. Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling under 310 CMR 22.06B(8) is not required to be conducted at taps targeted for lead and copper sampling under 310 CMR 22.06B(7)(a). [Note: Systems may find it convenient to conduct tap sampling for water quality parameters at sites used for coliform sampling under 310 CMR 22.05.

b. Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

2. Number of samples.

a. Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under 310 CMR 22.06B(8)(b) - (e) from the following number of sites.

System Size (# People Served)	# of Sites For Water Quality Parameters
>100,000	25
10,001-100,000	10
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
<100	1

b. Systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in 310 CMR 22.06B(8)(b). During each monitoring period specified in 310 CMR 22.06B(8)(c) through (e), systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

(b) Initial Sampling. All large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each six-month monitoring period specified in 310 CMR 22.06B(7)(d)1. All small and medium-size systems shall measure the applicable water quality parameters at the locations specified below during each six-month monitoring period specified in 310 CMR 22.06B(7)(d)1, during which the system exceeds the lead or copper action level.

1. At taps:

- pH;
- alkalinity;
- orthophosphate, when an inhibitor containing a phosphate compound is used;
- silica, when an inhibitor containing a silicate compound is used;
- calcium;
- conductivity; and
- water temperature.

2. At each entry point to the distribution system: all of the applicable parameters listed in 310 CMR 22.06B(8)(b)1.

(c) Monitoring after installation of corrosion control. Any large system which installs optimal corrosion control treatment pursuant to 310 CMR 22.06B(2)(d)4, shall measure the water quality parameters at the locations and frequencies specified below during each six-month monitoring period specified in 310 CMR 22.06B(7)(d)2.a. Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in 310 CMR 22.06B(7)(d)2.b. in which the system exceeds the lead or copper action level.

1. At taps, two samples for:

- pH;
- alkalinity;

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- c. orthophosphate, when an inhibitor containing a phosphate compound is used;
 - d. silica, when an inhibitor containing a silicate compound is used;
 - e. calcium, when calcium carbonate stabilization is used as part of corrosion control.
2. At each entry point to the distribution system, one sample every two weeks (bi-weekly) for:
- a. pH;
 - b. when alkalinity is adjusted as part of optimal corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration; and
 - c. when a corrosion inhibitor is used as part of optimal corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate or silica (whichever is applicable).

(d) Monitoring after Department specifies water quality parameter values for optimal corrosion control. After the Department specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under 310 CMR 22.06B(3)(f) all large systems shall measure the applicable water quality parameters in accordance with 310 CMR 22.06B(8)(c) during each monitoring period specified in 310 CMR 22.06B(7)(d)3. Any small or medium-size system shall conduct such monitoring during each monitoring period specified in 310 CMR 22.06B(7)(d)3. in which the system exceeds the lead or copper action level. The system may take a confirmation sample for any water quality parameter value no later than three days after the first sample. If a confirmation sample is taken, the result must be averaged with the first sampling result and the average must be used for any compliance determinations under 310 CMR 22.06B(3)(g) the Department has the discretion to delete results of obvious sampling errors from this calculation.

(e) Reduced monitoring.

1. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of two consecutive six-month monitoring periods under 310 CMR 22.06B(8)(d) shall continue monitoring at the entry point(s) to the distribution system as specified in 310 CMR 22.06B(8)(c)2. Such system may collect two tap samples for applicable water quality parameters from the following reduced number of sites during each six-month monitoring period.

System Size (# People Served)	Reduced # of Sites for Water Quality Parameters
>100.00	10
10,001 to 100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
<100	1

2. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f) during three consecutive years of annual monitoring under 310 CMR 22.06B(8)(e)2. a may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in 310 CMR 22.06B(8)(e)1. from annually to every three years.

3. A water system that conducts sampling annually shall collect these samples evenly throughout the year so as to reflect seasonal variability.

4. Any water system subject to the reduced monitoring frequency that fails to operate within the range of values for the water quality parameters specified by the Department under 310 CMR 22.06B(3)(f) shall resume tap water sampling in accordance with the number and frequency requirements in 310 CMR 22.06B(8)(c).

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(f) Additional monitoring by systems. The results of any monitoring conducted in addition to the minimum requirements of 310 CMR 22.06B(8) shall be considered by the system and the Department in making any determinations (i.e., determining concentrations of water quality parameters) under 310 CMR 22.06B(8) or 310 CMR 22.06B(3).

(9) Monitoring requirements for lead and copper in source water.

(a) Sample location, collection methods, and number of samples.

1. A water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with 310 CMR 22.06B(7) shall collect lead and copper source water samples in accordance with the requirements regarding sample location, number of samples, and collection methods specified in 310 CMR 22.06(IOC's). [inorganic chemical sampling].

[Note: The timing of sampling for lead and copper shall be in accordance with 310 CMR 22.06B(9)(b) and (c), and not dates or times specified in 310 CMR 22.06A, Table 3.]

2. Where the results of sampling indicate an exceedance of 5ppb, the maximum permissible source water levels established under 310 CMR 22.06B(4)(b)4., the Department may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point. If a Department-required confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the Department-specified maximum permissible levels. Any sample value below the detection limit shall be considered to be zero. Any value above the detection limit but below the PQL shall either be considered as the measured value or be considered one-half the PQL.

(b) Monitoring frequency after system exceeds tap water action level. Any system which exceeds the lead or copper action level at the tap shall collect one source water sample from each entry point to the distribution system within six months after the exceedance.

(c) Monitoring frequency after installation of source water treatment. Any system which installs source water treatment pursuant to 310 CMR 22.06B(4)(a)3. shall collect an additional source water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in 310 CMR 22.06B(4)(a)4.

(d) Monitoring frequency after the Department determines that source water treatment is not needed.

1. A system shall monitor at the frequency specified below in cases where the Department determines that the system is not required to install source water treatment under 310 CMR 22.06B(4)(b)2.

a. A water system using only groundwater shall collect samples once during the three-year compliance period (as that term is defined in 310 CMR 22.02) in effect when the applicable Department determination under 310 CMR 22.06B(9)(d)1. is made. Such systems shall collect samples once during each subsequent compliance period.

b. A water system using surface water (or a combination of surface and groundwater) shall collect samples once during each year, the first annual monitoring period to begin on the date on which the applicable Department determination is made under 310 CMR 22.06B(9)(d)1.

2. A system is not required to conduct source water sampling for lead and/or copper if the system meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system under 310 CMR 22.06B(9)(d)1.a. or b.

(e) Reduced monitoring frequency.

1. A water system using only groundwater which demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and/or copper concentrations specified by the Department in 310 CMR 22.06B(4)(b)4. during at least three consecutive compliance periods under 310 CMR 22.06B(9)(d)1. may reduce the monitoring frequency for lead and/or copper to once during each nine-year compliance cycle (as that term is defined in 310 CMR 22.02).

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2. A water system using surface water (or a combination of surface and ground waters) which demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Department in 310 CMR 22.06B(4)(b)4. for at least three consecutive years may reduce the monitoring frequency in 310 CMR 22.06B(9)(d)1. to once during each nine-year compliance cycle (as that term is defined in 310 CMR 22.06(4)).

3. A water system that uses a new source of water is not eligible for reduced monitoring for lead and/or copper until concentrations in samples collected from the new source during three consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the Department in 310 CMR 22.06B(4)(a)5.

(10) Analytical Methods.

(a) Analyses for lead, copper, pH, conductivity, calcium, alkalinity, orthophosphate, silica, and temperature shall be conducted using the following methods:

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<u>Contaminant</u>	<u>Methodology</u> ⁹	<u>ANALYTICAL METHODS</u>			
		<u>Reference (Method Number)</u>			<u>USGS</u> ⁵
		<u>EPA</u> ²	<u>ASTM</u> ³	<u>SM</u> ³⁴	
Lead	Atomic absorption: furnace technique	----	D3559-90D	3113B	
	Inductively-coupled plasma: mass spectrometry	² 200.8			
	Atomic absorption; platform furnace technique	² 200.9			
Copper	Atomic absorption; furnace technique	----	D1688-90C	3113B	
	Atomic absorption: direct aspiration	----	D1688-90A	3111-B	
	Inductively-coupled plasma	² 200.7 ⁵		3120B	
	Inductively-coupled plasma: mass spectrometry	² 200.8 ⁶			
	Atomic absorption: platform furnace	² 200.9 ⁷			
pH	Electrometric	¹ 150.1	D1293-84	4500-H-B	
		¹ 150.2			
Conduc- tivity	Conductance	----	D1125-91A	2510B	
Calcium	EDTA titrimetric	----	D511-93A	3500-Ca-D	
	Atomic absorption; direct aspiration	¹ 215.1	D511-93B	3111B	
	Inductively-coupled plasma	² 200.7		3120B	
Alkalinity	Titrimetric	----	D1067-92B	2320B	
	Electrometric titration				I-1030-85
Ortho- phosphate, unfiltered, no digestion or hydrolysis	Colorimetric, automated, ascorbic acid	⁸ 365.1		4500-P-F	
	Colorimetric, ascorbic acid, two reagent	----			
	Colorimetric, ascorbic acid, single reagent	----	D515-88A	4500-P-E	
	Colorimetric, phosphomolybdate:				1-1601-85
	automated-segmented flow:				1-2601-90 ¹
	automated discrete				1-2598-85
Silica	Ion Chromatography	⁸ 300.0	D4327-91	4110	
	Colorimetric, molybdate blue;				1-1700-85
	automated-segmented flow				1-2700-85
	Colorimetric	----	D859-88		
	Molybdosilicate			4500-Si-D	
	Heteropoly blue			4500-Si-E	
	Automated method for molybdate-reactive silica			4500-Si-F	
	Inductively-coupled plasma	² 200.7 ⁵		3120B	
Temperature	Thermometric			2550B	

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ANALYTICAL METHODS (continued)

¹ The procedures 239.2, 220.2, 220.1, 150.1, 150.2, 120.1, 215.2, 215.1, 310.1, 365.1, 365.3, 365.2, and 370.1 are incorporated by reference and shall be done in accordance with "Methods for Chemical Analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, OH (EPA-600/4-79-020). Revised March 1983, pp. 239.2-1 through 239.2-2 and metals-1 through metals-19, 220.2-1 through 220.2-2 and metals-1 through metals-19, 220.1-1 through 220.1-2 and metals-1 through metals-19, 150.1-1 through 150.1-3, 150.2-1 through 150.2-3, 120.1-1 through 120.1-3, 215.2-1 through 215.2-3, 215.1-1 through 215.1-2, 310.1-1 through 310.1-3, 365.1-1 through 365.1-9, 365.3-1 through 365.3-4, 365.2-1 through 365.2-6, and 370.1-1 through 370.1-5, respectively. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be obtained from ORD Publications, CERL, EPA, Cincinnati, OH 45268. Copies may be inspected at the United States Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

² The procedures D3559-85D, D1688-90C, D1688-90A, D1293-84B, D1125-82B, D511-88A, D511-88B, D1067-88B, D515-88A, D4327-88, and D859-88 are incorporated by reference and shall be done in accordance with Annual Book of ASTM Standards, Vol. 11.01. American Society for Testing and Materials, 1990, 401-403, 352-353, 349-350, 212-214, 137-138, 309-312, 312-314, 123-124, 459-462, 260-265, and 479-481, respectively. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be obtained from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103. Copies may be inspected at the United States Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

³ The procedures 3113, 3111-B, 3120, 4500-H, 2510, 3500-Ca-D, 3120, 2320, 4500-P-F, 4500-P-E, 4110, 4500-Si-D, 4500-Si-E, 4500-Si-F, and 2550 are incorporated by reference and shall be done in accordance with "Standard Methods for the Examination of Water and Wastewater," 17th Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1989, pp. 3-32 through 3-43, 3-20 through 3-23, 3-53 through 3-63, 4-94 through 4-102, 2-57 through 2-61, 3-85 through 3-87, 3-20 thru 3-23, 3-53 thru 3-63, 2-35 through 2-39, 4-178 through 4-181, 4-177 through 4-178, 4-2 through 4-6, 4-184 through 4-187, 4-188 through 4-189, 4-189 through 4-191, and 2-80 through 2-81, respectively. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be obtained from the American Water Works Association, Customer Services, 6666 West Quincy Avenue, Denver, Co 80235. Phone (303) 794-7711. Copies may be inspected at the United States Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

⁴ The procedures 1-1030-85, 1-1601-85, 1-2601-85, 1-2598-85, 1-1700-85, and 1-2700-85 are incorporated by reference and shall be done in accordance with "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," 3rd edition, U.S. Department of Interior, U.S. Geological Survey, 1989, pp. 55-56, 381-382, 383-385, 387-388, 415-416, and 417-419, respectively. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be purchased from the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, Co 80225. Copies may be inspected at the United States Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

⁵ "Determination of Metals and Trace Elements in Water and Wastes by Inductively-Coupled Plasma--Atomic Emission Spectrometry," Revision 3.3, April 1991, "Methods for the Determination of Metals in Environmental Samples," Office of Research and Development, Washington, DC 20460, EPA/4-91/010, June 1991.

⁶ "Determination of Trace Elements in Water and Wastes by Inductively-Coupled Plasma--Mass Spectrometry," Revision 4.4, April 1991, "Methods for the Determination of Metals in Environmental Samples," Office of Research and Development, Washington, DC 20460, EPA/600/4-91/010, June, 1991.

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ANALYTICAL METHODS (continued)

⁷"Determination of Trace Elements by Stabilized Temperature Graphite Furnace Atomic Absorption Spectrometry, Revision 1.2, April 1991, "Methods for the Determination of Metals in Environmental Samples." Office of Research and Development, Washington, DC 20460, EPA/600/4-91/010, June 1991.

⁸"Determination of Inorganic Ions in Water by Ion Chromatography," Method 300.0, December 1989, U.S. EPA EMSL. This document is available from U.S. EPA, EMSL, Cincinnati, OH 45268.

⁹For analyzing lead and copper, the technique applicable to total metals must be used and samples cannot be filtered. Samples that contain less than 1 NTU (nephelometric turbidity unit) and are properly preserved (conc HNO³ TO pH <2) may be analyzed directly (without digestion) for total metals; otherwise, digestion is required. Turbidity must be measured on the preserved samples just prior to when metals analysis is initiated. When digestion is required, the "total recoverable" technique as defined in the method must be used.

1. Analyses under 310 CMR 22.06B(9) shall only be conducted by laboratories that have been certified by EPA or the Department. To obtain certification to conduct analyses for lead and copper, laboratories must:
 - a. Analyze performance evaluation samples which include lead and copper provided by EPA Environmental Monitoring and Support Laboratory or equivalent samples provided by the Department; and
 - b. quantitative acceptance limits as follows:
 - (i) Lead: +30% of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.005 mg/L, and
 - (ii) Copper: +10% of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.050 mg/L;
 - c. Achieve method detection limits according to the procedures in Appendix B of Part 136 of this title as follows:
 - (i) Lead: 0.001 mg/L (only if source water compositing is done under 310 CMR 22.06A, and
 - (ii) Copper: 0.001 mg/L or 0.020 mg/L when atomic absorption direct aspiration is used (only if source water compositing is done under 40 CFR 141.23(a)(4)); or
 - d. Be currently certified by EPA or the Department to perform analyses to the specifications described in 310 CMR 22.06B(10)(a)2.
2. The Department has the authority to allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected and analyzed in accordance with the requirements of 310 CMR 22.06B(a).
3. All lead levels measured between the PQL and the MDL must be either reported as measured or they can be reported as one-half the PQL (0.0025 mg/L). All levels below the lead MDL must be reported as zero.
4. All copper levels measured between the PQL and the MDL must be either reported as measured or they can be reported as one-half the PQL (0.025 mg/L). All levels below the copper MDL must be reported as zero.

(11) Reporting requirements. All water systems shall report all of the following information to the Department in accordance with 310 CMR 22.06B(11).

(a) Reporting requirements for tap water monitoring for lead and copper and for water quality parameter monitoring

1. A water system shall report the information specified below for all tap water samples within the first ten days following the end of each applicable monitoring period specified in 310 CMR 22.06B(7), (8), and (9) (i.e., every six-months, annually, or every three years).
 - a. the results of all tap samples for lead and copper including the location of each site and the criteria under 310 CMR 22.06B(7)(a)3., 4., 5., 6., and or 7. under which the site was selected for the system's sampling pool;
 - b. a certification that each first draw sample collected by the water system is one-liter in volume and, to the best of their knowledge, has stood motionless in the service line, or in the interior plumbing of a sampling site, for at least six hours;

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- c. where residents collected samples, a certification that each tap sample collected by the residents was taken after the water system informed them of proper sampling procedures specified in 310 CMR 22.06B(7)(b)2.;
 - d. the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period (calculated in accordance with 310 CMR 22.06B(11)(c)3.;
 - e. with the exception of initial tap sampling conducted pursuant to 310 CMR 22.06B(7)(d)1., the system shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;
 - f. the results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected under 310 CMR 22.06B(8)(b) through (e);
 - g. the results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under 310 CMR 22.06B(8)(b) through (e).
2. By the applicable date in 310 CMR 22.06B(7)(d)1., for commencement of monitoring, each community water system which does not complete its targeted sampling pool with tier 1 sampling sites meeting the criteria in 310 CMR 22.06B(7)(a)3. shall send a letter to the Department justifying its selection of tier 2 and/or tier 3 sampling sites under 310 CMR 22.06B(7)(a)4. and/or (a)5.
 3. By the applicable date in 310 CMR 22.06B(7)(d)1. for commencement of monitoring, each non-transient, non-community water system which does not complete its sampling pool with tier 1 sampling sites meeting the criteria in 310 CMR 22.06B(7)(a)6. shall send a letter to the Department justifying its selection of sampling sites under 310 CMR 22.06B(7)(a)7.
 4. By the applicable date in 310 CMR 22.06B(7)(d)1. for commencement of monitoring, each water system with lead service lines that is not able to locate the number of sites served by such lines required under 310 CMR 22.06B(7)(a)9., shall send a letter to the Department demonstrating why it was unable to locate a sufficient number of such sites based upon the information listed in 319 CMR 22.06B(7)(a)2.
 5. Each water system that requests that the Department reduce the number and frequency of sampling shall provide the information required under 310 CMR 22.06B(7)(d)4.
- (b) Source water monitoring reporting requirements.
1. A water system shall report the sampling results for all source water samples collected in accordance with 310 CMR 22.06B(9). within the first ten days following the end of each source water monitoring period (i.e., annually, per compliance period, per compliance cycle) specified in 310 CMR 22.06B(9).
 2. With the exception of the first round of source water sampling conducted pursuant to 310 CMR 22.06B(9)(b), the system shall specify any site which was not sampled during previous monitoring periods, and include an explanation of why the sampling point has changed.
- (c) Corrosion control treatment reporting requirements. By the applicable dates under 310 CMR 22.06B(2), systems shall report the following information:
1. for systems demonstrating that they have already optimized corrosion control, information required in 310 CMR 22.06B(2)(b)2. or 3.
 2. for systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under 310 CMR 22.06B(3)(a).
 3. for systems required to evaluate the effectiveness of corrosion control treatments under 310 CMR 22.06B(3)(c) the information required by 310 CMR 22.06B(3)(c).
 4. for systems required to install optimal corrosion control designated by the Department under 310 CMR 22.06B(3)(d), a letter certifying that the system has completed installing that treatment.
- (d) Source water treatment reporting requirements. By the applicable dates in 310 CMR 22.06B(4), systems shall provide the following information to the Department:
1. if required under 310 CMR 22.06B(4)(b)1., their recommendation regarding source water treatment;

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2. for systems required to install source water treatment under 310 CMR 22.06B(4)(b)2., a letter certifying that the system has completed installing the treatment designated by the Department within 24 months after the Department designated the treatment.

(e) Lead service line replacement reporting requirements. Systems shall report the following information to the Department to demonstrate compliance with the requirements of 310 CMR 22.06B(5):

1. Within 12 months after a system exceeds the lead action level in sampling referred to in 310 CMR 22.06B(5)(a), the system shall demonstrate in writing to the Department that it has conducted a materials evaluation, including the evaluation in 310 CMR 22.06B(7)(a), to identify the initial number of lead service lines in its distribution system, and shall provide the Department with the system's schedule for replacing annually at least 7% of the initial number of lead service lines in its distribution system.
2. Within 12 months after a system exceeds the lead action level in sampling referred to in 310 CMR 22.06B(5)(a), and every 12 months thereafter, the system shall demonstrate to the Department in writing that the system has either:
 - a. replaced in the previous 12 months at least 7% of the initial lead service lines (or a greater number of lines specified by the Department under 310 CMR 22.06B(5)(f) in its distribution system, or
 - b. conducted sampling which demonstrates that the lead concentration in all service line samples from an individual line(s), taken pursuant to 310 CMR 22.06B(7)(b)3., is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and/or which meet the criteria in 310 CMR 22.06B(5)(c) shall equal at least 7% of the initial number of lead lines identified under 310 CMR 22.06B(11)(a) (or the percentage specified by the Department under 310 CMR 22.06B(5)(f).
3. The annual letter submitted to the Department under 310 CMR 22.06B(11)(e)2. shall contain the following information:
 - a. the number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;
 - b. the number and location of each lead service line replaced during the previous year of the system's replacement schedule;
 - c. if measured, the water lead concentration and location of each lead service line sampled, the sampling method, and the date of sampling.
4. As soon as practicable, but in no case later than three months after a system exceeds the lead action level in sampling referred to in 310 CMR 22.06B(5)(a), any system seeking to rebut the presumption that it has control over the entire lead service line pursuant to 310 CMR 22.06B(5)(d) shall submit a letter to the Department describing the legal authority (e.g., state statutes, municipal ordinances, public service contracts or other applicable legal authority) which limits the system's control over the service lines and the extent of the system's control.

(f) Public education program reporting requirements. By December 31st of each year, any water system that is subject to the public education requirements in 310 CMR 22.06B(6) shall submit a letter to the Department demonstrating that the system has delivered the public education materials that meet the content requirements in 310 CMR 22.06B(6)(a) and (b) and the delivery requirements in 310 CMR 22.06B(6)(c). This information shall include a list of all the newspapers, radio stations, television stations, facilities and organizations to which the system delivered public education materials during the previous year. The water system shall submit the letter required by 310 CMR 22.06B(11)(f) annually for as long as it exceeds the lead action level.

(g) Reporting of additional monitoring data. Any system which collects sampling data in addition to that required by this subpart shall report the results to the Department within the first ten days following the end of the applicable monitoring period under 310 CMR 22.06B(7), (8), and (9) during which the samples are collected.

(12) Recordkeeping requirements. Any system subject to the requirements of 310 CMR 22.06B shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, Department determinations, and any other information required by 310 CMR 22.06B(2) through 310 CMR 22.06B(9). Each water system shall retain the records required by 310 CMR 22.06B for no fewer than 12 years.

22.06C: Compliance with Secondary Maximum Contaminant Level and Public Notification for Fluoride

Community water systems sampling pursuant to 310 CMR 22.06 which exceed the secondary maximum contaminant level for fluoride, but do not exceed the maximum contaminant level for fluoride, shall comply with 310 CMR 22.16(2).

Secondary Maximum Contaminant Level for Fluoride - 2.0 mg/l

22.07: Maximum Trihalomethanes Contaminant Levels, Monitoring Requirements and Analytical Method

(1) MCLs for Trihalomethanes Chemicals: The maximum contaminant level for total trihalomethanes of 310 CMR 22.07 applies only to community water systems which serve a population of 10,000 or more individuals and which add a disinfectant (oxidant) to the water in any part of the drinking water treatment process. Compliance with the maximum contaminant level for total trihalomethanes is calculated pursuant to 310 CMR 22.07(2).

Contaminant

Total trihalomethanes are the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform).

Level (mg/l)

The maximum contaminant level for total trihalomethanes - 0.10 milligrams per liter.

(2) Total Trihalomethanes Sampling, Analytical and Other Requirements:

(a) Community water systems that serve a population of 10,000 or more individuals and add a disinfectant (oxidant) to drinking water in any part of the treatment process shall sample and analyze for total trihalomethanes in accordance with 310 CMR 22.07(2)(a). Community water systems that serve a population of 75,000 or more individuals shall begin sampling and analyses for total trihalomethanes by November 29, 1980. Community water systems that serve a population of 10,000 to 74,999 individuals shall begin sampling and analyses for total trihalomethanes by November 29, 1982. Compliance with the maximum contaminant level for total trihalomethanes shall be determined on the basis of the running annual average of quarterly analytic results. If the average of sampling results covering any 12 month period exceeds the maximum contaminant level, the supplier of water shall: (1) report to the Department in accordance with 310 CMR 22.15; and (2) notify the public of the exceedance in accordance with 310 CMR 22.16. Monitoring after an exceedance shall be at a frequency prescribed by the Department until a monitoring schedule as a condition to a variance, exemption or enforcement action becomes effective.

(b) For all community water systems utilizing surface water sources in whole or in any part, and for all community water systems utilizing only ground water sources that have not been determined by the Department to qualify for the reduced monitoring requirements of 310 CMR 22.07(2)(d), analyses for total trihalomethanes shall be performed at quarterly intervals on at least four water samples for each treatment plant used by the community water system. All of the samples taken per quarter shall be collected within a 24-hour period. At least 25% of the samples shall be taken at locations within the distribution system reflecting the maximum residence time of the water in the system. The remaining 75% shall be taken at representative locations in the distribution system, taking into account the number of persons served, the different sources of water and the different treatment methods employed. The results of all analyses per quarter shall be arithmetically averaged and reported to the Department within 30 days of the system's receipt of such results. All samples collected shall be used in the computation of the average, unless the analytical results are invalidated for technical reasons, in which case the results thus invalidated and an explanation of why the results were invalidated shall be included in the report required herein. The Department reserves the right to require results invalidated by the supplier of water to be included in the computation of the average whenever the Department deems such action necessary or appropriate to protect the public health.

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(c) Upon the written request of a community water system subject to 310 CMR 22.07(2)(b), the monitoring frequency required by 310 CMR 22.07(2)(b) may be reduced by express written permission of the Department to one sample analyzed for total trihalomethanes per quarter taken at a point in the distribution system reflecting the maximum residence time of the water in the system, upon a written determination by the Department that the data from at least one year of monitoring in accordance with 310 CMR 22.07(2)(b) and local conditions demonstrate that total trihalomethane concentrations will be consistently below the maximum contaminant level. If at any time during which a community water system is subject to 310 CMR 22.07(2)(c), the results from any analysis exceed 0.10 milligrams of total trihalomethanes per liter of water and such results are confirmed by at least one check sample taken promptly after such results are received, or if no such check sample is promptly taken, or if the community water system makes any significant change to its source of water or treatment, the community water system shall immediately become subject to 310 CMR 22.07(2)(b) and for at least one year thereafter shall not be eligible for permission to become subject to 310 CMR 22.07(2)(c). The Department reserves the right to order a community water system to increase the monitoring frequency above the minimum prescribed in 310 CMR 22.07(2)(c) whenever the Department deems such action necessary to detect variations of total trihalomethane levels within the distribution system. All the samples thus taken shall be collected within a 24 hour period.

(d) Upon written request of a community water system which would otherwise be subject to 310 CMR 22.07(2)(b) and which utilizes only ground water sources, the monitoring frequency required by 310 CMR 22.07(2)(b) may be reduced by express written permission of the Department to one sample analyzed for maximum total trihalomethane potential per year for each treatment plant used by the community water system, which samples shall be taken at a point in the distribution system reflecting the maximum residence time of the water in the system. The Department may grant such permission only upon express written determination that, based upon the data submitted by the supplier of water, the community water system has a maximum total trihalomethane potential of less than 0.10 milligrams per liter and that, based upon an assessment of the local conditions of the system, the community water system is not likely to approach or exceed the maximum contaminant level for total trihalomethanes. If at any time during which a community water system is subject to 310 CMR 22.07(2)(d) the results from any analysis taken for maximum total trihalomethane potential are equal to or greater than 0.10 milligrams per liter, and such results are confirmed by at least one check sample taken promptly after such results are received, or if no such check sample is promptly taken, the community water system shall immediately become subject to 310 CMR 22.07(2)(b) and for at least one year thereafter shall not be eligible for permission to become subject to 310 CMR 22.07(2)(c) or (d). In the event of any significant change to the community water system's raw water or treatment program, the community water system shall immediately analyze an additional sample for maximum total trihalomethane potential taken at a point in the distribution system reflecting maximum residence time of the water in the system for the purpose of determining whether the community water system must become subject to 310 CMR 22.07(2)(b). The results of all analyses pursuant to 310 CMR 22.07(2)(d) shall be reported to the Department within 30 days of the community water system's receipt of such results. All samples collected pursuant to 310 CMR 22.07(2)(d) shall be used for determining whether the community water system is to be made subject to 310 CMR 22.07(2)(b), unless the analytical results are invalidated for technical reasons, in which case the results thus invalidated and an explanation of why the results were invalidated shall be included in the report required herein. The Department reserves the right to require the results invalidated by the supplier of water to be included in determining whether the community water system is to be made subject to 310 CMR 22.07(2)(b) whenever the Department deems such action necessary or appropriate to protect the public health. The Department reserves the right to order a community water system to increase the monitoring frequency above the minimum prescribed in 310 CMR 22.07(2)(d) whenever the Department deems such action necessary to detect variations of total trihalomethane levels within the distribution system. All of the samples thus taken shall be collected within a 24 hour period.

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(e) The minimum number of samples required to be taken by a community water system pursuant to 310 CMR 22.07(b), (c), or (d) shall be based on the number of treatment plants used by the community water system, except that multiple wells drawing raw water from a single aquifer may, with the express written permission of the Department, be considered one treatment plant for determining the minimum number of samples required.

(f) Sampling and analyses made pursuant to 310 CMR 22.07 shall be conducted by one of the methods listed in 310 CMR 22.07(2)(f)1. through (f)3. or those approved by EPA. Samples for total trihalomethanes shall be dechlorinated upon collection to prevent further production of trihalomethanes, according to the procedures described in the methods listed below or those approved by EPA. Samples for maximum total trihalomethane potential should not be dechlorinated, and should be held for seven days at 25°C prior to analysis, according to the procedures described in the methods listed below or those approved by EPA.

1. "The Analysis of Trihalomethanes in Finished Waters by the Purge and Trap Method." Method 501.1, EMSL, EPA, Cincinnati, Ohio. (This method is effective until July 1, 1996)

2. "The Analysis of Trihalomethanes in Drinking Water by Liquid/Liquid Extraction." Method 501.2, EMSL, EPA, Cincinnati, Ohio. (This method is effective until July 1, 1996)

3. "Determination of Chlorination Disinfection Byproducts and Chlorinated Solvents in Drinking Water by Liquid-Liquid Extraction and Gas Chromatography with Electron-Capture Detection", Method 551, EMSL, EPA, Cincinnati, Ohio, EPA method 551 is contained in Methods for the Determination of Organic Compounds in Drinking Water, Supplement I, EPA/600/4-90/020, July 1990.

4. "Volatile Organic Compounds in Water By Purge and Trap Capillary Gas Chromatography with Photoionization and Electrolytic conductivity Detector in series." Method 502.2, EMSL, EPA, Cincinnati, Ohio, EPA Methods 502.2 is contained in Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039 (revised July 1991).

5. "Volatile Organic Chemicals in Water by Purge and Trap Capillary Gas Chromatography/Mass Spectrometry." Method 524.2, EMSL, EPA, Cincinnati, Ohio, EPA Method 524.2 is contained in Methods for the Determination of Organic Compounds in Drinking Water, Supplement II EPA/600/R-92/129 August, 1992.

(g) Before a community water system makes any significant modifications to its existing treatment process for the purpose of achieving compliance with 310 CMR 22.07(1), the supplier of water must submit to the Department for its approval a detailed plan setting forth the proposed modification and the safeguards which will be implemented to ensure that the bacteriological quality of the drinking water supplied to consumers by said community water system will not be adversely affected by such modification. Each community water system shall comply with the provisions set forth in the Department approved plan. Effective November 29, 1979, every plan approved by the Department shall, in addition to any other requirement imposed by the Department, require the community water system modifying its disinfection practice to:

1. Evaluate the water system for sanitary defects and evaluate the source water for biological purity.

2. Evaluate its existing treatment practices and consider improvements that will minimize disinfectant demand and optimize finished water quality throughout the distribution system.

3. Conduct additional monitoring to assure continued maintenance of optimal biological quality in finished water. Examples of when this requirement shall be enforced include when chloramines are introduced as disinfectants or when prechlorination is being discontinued. When chlorine dioxide is being used as a disinfectant, additional monitoring for chlorate, chlorite and chlorine dioxide shall be required except when the Department determines expressly and in writing that such monitoring is unnecessary. Standard plate count analyses shall also be required before and after any modifications unless the Department determines expressly and in writing that such analyses are not appropriate.

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4. Demonstrate an active disinfectant residual throughout the distribution system at all times during and after the modification.
5. Provide baseline water quality survey data of the distribution system as required by the Department.

22.07A: Synthetic Organic Chemicals (SOC) Sampling and Analytical Requirements

(1) Synthetic Organic Chemicals MCLs: The following maximum contaminant levels for organic contaminants apply to community water systems and non-transient, non-community water systems.

	<u>CAS No.</u>	<u>Contaminant</u>	<u>MCL (mg/l)</u>
(a)	15972-60-8	Alachlor	0.002
(b)	Reserved		
(c)	Reserved		
(d)	Reserved		
(e)	1912-24-9	Atrazine	0.003
(f)	1563-66-2	Carbofuran	0.04
(g)	57-74-9	Chlordane	0.002
(h)	96-12-8	Dibromochloropropane	0.0002
(i)	94-75-7	2,4-D	0.07
(j)	72-20-80	Endrin	0.002
(k)	106-93-4	Ethylene dibromide	0.00002
(l)	76-44-8	Heptachlor	0.0004
(m)	1024-57-3	Heptachlor epoxide	0.0002
(n)	58-89-9	Lindane	0.0002
(o)	72-43-5	Methoxychlor	0.04
(p)	1336-36-3	Polychlorinated biphenyls	0.0005
(q)	87-86-5	Pentachlorophenol	0.001
(r)	8001-35-2	Toxaphene	0.003
(s)	93-72-1	2,4,5-TP	0.05
(t)	50-32-8	Benzo(a)pyrene	0.0002
(u)	75-99-0	Dalapon	0.2
(v)	103-23-1	Di(2-ethylhexyl) adipate	0.4
(w)	117-81-7	Di(2-ethylhexyl) phthalate	0.006
(x)	88-85-7	Dinoseb	0.007
(y)	85-00-7	Diquat	0.02
(z)	145-73-3	Endothall	0.1
(aa)	1071-53-6	Glyphosate	0.7
(bb)	118-74-1	Hexachlorobenzene	0.001
(cc)	77-47-4	Hexachlorocyclopentadiene	0.05
(dd)	23135-22-0	Oxamyl (Vydate)	0.2
(ee)	1918-02-1	Picloram	0.5
(ff)	122-34-9	Simazine	0.004
(gg)	1746-01-6	2,3,7,8-TCDD(Dioxin)	3×10^{-8}

(2) SOC Sampling Requirements: Beginning with the initial compliance period, analysis of the contaminants listed in 310 CMR 22.07A(1)(a) through (gg) for the purposes of determining compliance with the maximum contaminant level shall be conducted as follows:

(a) SOC Ground Water Monitoring Protocols: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) SOC Surface Water Monitoring Protocols: Surface water systems [Note: For purposes of 310 CMR 22.07A(2)(b), surface water systems include systems with a combination of surface and ground sources.] shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system

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after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources: If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

(d) Consecutive System Monitoring: Public water systems that obtain water from another public water system are exempt from conducting compliance monitoring for the purchased portion of the system for the organic chemicals (SOC) under 310 CMR 22.07(A), provided that the system from which the water is obtained has conducted the analyses required under 310 CMR 22.07(A), unless otherwise specified by the Department.

(3) SOC Monitoring Frequency:

(a) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in 310 CMR 22.07A(1) during each compliance period beginning with the compliance period starting January 1, 1993.

(b) Systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period, may reduce the sampling frequency to a minimum of two quarterly samples in one year during each repeat compliance period.

(c) Systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period.

(4) SOC Sampling Waivers: Each community and non-transient water system may apply to the Department for a waiver from the requirement of 310 CMR 22.07A(3). A system must reapply for a waiver for each compliance period.

(a) Basis of an SOC Sampling Waiver: The Department may grant a waiver after evaluating the following factor(s): Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the Department reveals no previous use of the contaminant within the watershed or Zone II or IWPA, a waiver may be granted. If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

1. Previous analytical results.
2. The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities. Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, home and gardens, and other land application uses.
3. The environmental persistence and transport of the pesticide or PCBs.
4. How well the water source is protected against contamination due to such factors as depth of the well and the type of soil and the integrity of the well casing and other protective measures considered relevant by the Department.
5. Elevated nitrate levels at the water supply source.
6. Use of PCBs in equipment used in the production, storage, or distribution of water (i.e., PCBs used in pumps, transformers, etc.).

(5) Detection of an SOC: If an organic contaminant listed in 310 CMR 22.07A(1) is detected (as defined by 310 CMR 22.07A(16)) in any sample, then:

(a) Each system shall report to the Department within seven days and shall monitor quarterly at each sampling point which resulted in a detection.

(b) The Department may decrease the quarterly monitoring requirement specified in 310 CMR 22.07A(5)(a) provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Department make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

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- (c) After the Department determines the system is reliably and consistently below the maximum contaminant level the Department may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.
 - (d) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Department for a waiver as specified in 310 CMR 22.07A(4)(a).
 - (e) If monitoring results in detection of one or more of certain related contaminants (heptachlor, heptachlor epoxide), then subsequent monitoring shall analyze for all related contaminants.
- (6) MCL Violation and Reliably/Consistently Below the MCL: Systems which violate the requirements of 310 CMR 22.07A(1) as determined by 310 CMR 22.07A(9) must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the Department determines the system is reliably and consistently below the MCL, as specified in 310 CMR 22.07A(9), the system shall monitor at the frequency specified in 310 CMR 22.07A(5)(c).
- (7) SOC Confirmation Sampling: The Department may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Department, the result must be averaged with the first sampling result and the average used for the compliance determination as specified by 310 CMR 22.07A(9). The Department has discretion to delete results of obvious sampling errors from this calculation.
- (8) Composite SOC Sampling: The total number of samples which must be analyzed may be reduced by compositing samples. Composite samples from a maximum of five sampling points are allowed provided that the detection limit of the method used for analysis is less than one-fifth of the MCL and none of the samples to be composited are representative of multiple sources. Compositing of samples must be approved by the Department and must be done in the laboratory and analyzed within the holding times specified by EPA-814B-92-002, Change 2 - September 1992 *Manual for the Certification of Laboratories Analyzing Drinking Water*, third edition. Compositing of sources with previous detections greater than the detection limit is not allowed, unless otherwise authorized by the Department.
- (a) If the concentration in the composite sample exceeds the detection limit for one or more contaminants listed in 310 CMR 22.07A(1), then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.
 - (b) If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these duplicates instead of resampling. The duplicate must be analyzed and the results reported to the Department within 14 days of collection.
 - (c) If the population served by the system is >3,300 persons, then compositing may only be permitted by the Department at sampling points within a single system. In systems serving ≤3,300 persons, the Department may permit compositing among different systems provided the 5-sample limit is maintained.
- (9) SOC Compliance Calculations: Compliance with 310 CMR 22.07A(1) shall be determined based on the analytical results obtained at each sampling point.
- (a) Greater than Annual: For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any samples below the detection limit shall be calculated as zero for purposes of determining the annual average.
 - (b) Annual or less: If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Department, the determination of compliance will be based on the average of two samples.

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(c) Average Exceeding SOC MCLs: When the average of four analyses made pursuant to 310 CMR 22.07A(5), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give public notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.

(10) SOC Analytical Methods: Analysis for the contaminants listed in 310 CMR 22.07A(1) shall be conducted using the following EPA methods or their equivalent as approved by EPA. These methods are contained in *Methods for the Determination of Organic Compounds in Drinking Water*, EPA-600/4-88-039, December 1988, Revised, July 1991, *Methods for the Determination of Organic Compounds in Drinking Water - Supplement I*, EPA 821-B-94-005, October 1994, *Methods for the Determination of Organic Compounds in Drinking Water - Supplement II*, EPA/600/R-92/129, August 1992. These documents and Method 1613, EPA/600/R-92/129, August 1992 are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027, PB92-27703 and PB95-104774 (respectively), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. The phone number is 800-553-6847. Methods 504.1, 508.1 and 525.2 are available from U.S. EPA EMSL, Cincinnati, OH 45268. The phone number is 513-569-7586. Method 6610 is contained in *Standard Methods for the Examination of Water and Wastewater 18th Edition Supplement*, 1994, American Public Health Association, 1015 Fifteenth Street NW, Wash., D.C. 20005. Method 6651 is contained in *Standard Methods for the Examination of Water and Wastewater 18th Edition*, 1992, American Public Health Association, 1015 Fifteenth Street NW, Wash., D.C. 20005.

(a) Method 504, "1,2-Dibromoethane (EDB) and 1,2-Dibromo-3-chloropropane (DBCP) in Water by Microextraction and Gas Chromatography." Method 504 can be used to measure dibromochloropropane (DBCP) and ethylene dibromide (EDB). This method effective until July 1, 1996.

(b) Method 504.1, "1,2-Dibromoethane (EDB), 1,2-Dibromo-3-chloropropane (DBCP), and 1,2,3-Trichloropropane (1,2,3-TCP) in Water by Microextraction and Gas Chromatography." Method 504.1 can be used to measure dibromochloropropane (DBCP) and ethylene dibromide (EDB).

(c) Method 505, "Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl (PCB) Products in Water by Microextraction and Gas Chromatography." Method 505 can be used to measure alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, toxaphene and simazine. Method 505 can be used as a screen for PCBs (as Aroclors).

(d) Method 506, "Determination of Phthalate and Adipate Esters in Drinking Water by Liquid-Liquid Extraction or Liquid-Solid Extraction and Gas Chromatography with Photoionization Detection." Method 506 can be used to measure di(2-ethylhexyl) phthalate and di(2-ethylhexyl) adipate.

(e) Method 507, "Determination of Nitrogen- and Phosphorus-Containing Pesticides in Ground Water by Gas Chromatography with a Nitrogen-Phosphorus Detector." Method 507 can be used to measure alachlor, atrazine and simazine.

(f) Method 508, "Determination of Chlorinated Pesticides in Water by Gas Chromatography with an Electron Capture Detector." Method 508 can be used to measure chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor and toxaphene. Method 508 can be used as a screen for PCBs (as Aroclors).

(g) Method 508.1, Revision 1.0, "Determination of Chlorinated Pesticides, Herbicides, and Organohalides by Liquid-Solid Extraction and Electron Capture Gas Chromatography." Method 508.1 can be used to measure alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor and simazine.

(h) Method 508A, "Screening for Polychlorinated Biphenyls by Perchlorination and Gas Chromatography." Method 508A is used to quantify PCBs as decachlorobiphenyl if detected in Methods 505 or 508.

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- (i) Method 515.1, "Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector." Method 515.1 can be used to measure 2,4-D, dalapon, dinoseb, pentachlorophenol, picloram and 2,4,5-TP (Silvex).
 - (j) Method 515.2, "Determination of Chlorinated Acids in Water using Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector." Method 515.2 can be used to measure 2,4-D, dinoseb, pentachlorophenol, picloram and 2,4,5-TP (Silvex).
 - (k) Method 525.1, Revision 3.0, "Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry." Method 525.1 can be used to measure alachlor, atrazine, chlordane, di(2-ethylhexyl)adipate, di(2-ethylhexyl)phthalate, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, pentachlorophenol, polynuclear aromatic hydrocarbons, simazine, and toxaphene. This method may be used until July 1, 1996.
 - (l) Method 525.2, Revision 1.0, "Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry." Method 525.2 can be used to measure alachlor, atrazine, benzo(a)pyrene, chlordane, di(2-ethylhexyl)adipate, di(2-ethylhexyl)phthalate, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, pentachlorophenol, simazine and toxaphene.
 - (m) Method 531.1, "Measurement of N-Methyl Carbamoyloximes and N-Methyl Carbamates in Water by Direct Aqueous Injection HPLC with Post-Column Derivatization." Method 531.1 can be used to measure, carbofuran and oxyamyl.
 - (n) Method 547, "Determination of Glyphosate in Drinking Water by Direct Aqueous Injection HPLC with Post Column Derivatization, and Fluorescence Detection." Method 547 can be used to measure glyphosate.
 - (o) Method 548, "Determination of Endothall in Aqueous Samples." Method 548 can be used to measure endothall. This method may be used until July 1, 1996.
 - (p) Method 548.1, "Determination of Endothall in Drinking Water by Ion-Exchange Extraction, Acidic Methanol Methylation and gas Chromatography/Mass Spectrometry." Method 548.1 can be used to measure endothall.
 - (q) Method 549.1, "Determination of Diquat and Paraquat in Drinking Water by Liquid-Solid Extraction and High Performance Liquid Chromatography with Ultraviolet Detection." Method 549.1 can be used to measure diquat.
 - (r) Method 550, "Determination of Polycyclic Aromatic Hydrocarbons in Drinking Water by Liquid-Liquid Extraction and HPLC with Coupled Ultraviolet and Fluorescence Detection." Method 550 can be used to measure benzo(a)pyrene.
 - (s) Method 550.1, "Determination of Polycyclic Aromatic hydrocarbons in Drinking Water by Liquid-Solid Extraction and HPLC with Coupled Ultraviolet and Fluorescence Detection." Method 550.1 can be used to measure benzo(a)pyrene.
 - (t) Method 551, "Determination of Chlorination Disinfection Byproducts and Chlorinated Solvents in Drinking Water by Liquid-Liquid Extraction and Gas Chromatography with Electron-Capture Detection." Method 551 can be used to measure ethylene dibromide (EDB), dibromochloropropane (DBCP).
 - (u) Method 552.1, "Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion-Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector." Method 552.1 can be used to measure dalapon.
 - (v) Method 555, "Determination of Chlorinated Acids in Water by High Performance Liquid Chromatography with a Photodiode Array Ultraviolet Detector." Method 555 can be used to measure 2,4-D, 2,4,5-TP (Silvex), dinoseb, pentachlorophenol and picloram.
 - (w) Method 1613, "Tetra- through Octa- Chlorinated Dioxins and Furans by Isotope Dilution." Method 1613 can be used to measure 2,3,7,8-TCDD (dioxin).
 - (x) Method 6610, "Carbamate Pesticides." Method 6610 can be used to measure carbofuran and oxamyl.
 - (y) Method 6651, "Glyphosate Herbicide (Proposed)." Method 6651 can be used to measure glyphosate.
- (11) Analysis for PCBs shall be conducted as follows:
- (a) Each system which monitors for PCBs shall analyze each sample using either Method 505 or Method 508.

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(b) If PCBs (as one of seven Aroclors) are detected as designated in 310 CMR 22.07A(11)(b) in any sample analyzed using Methods 505 or 508, the system shall reanalyze the sample using Method 508A to quantitate PCBs (as decachlorobiphenyl). The mean of the method detection limits of all Aroclors shall be 0.00025 mg/l except for Aroclor 1221 which is 0.02mg/l.

(c) Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses using Method 508A.

(12) Grandfathered SOC Data: The Department may allow the use of monitoring data collected after January 1, 1990, for purposes of satisfying the initial monitoring requirement of 310 CMR 22.07A(2), if in the opinion of the Department, the data are generally consistent with the requirements of 310 CMR 22.07A(2). A single sample rather than four quarterly samples may be allowed by the Department to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(13) Increased SOC Sampling: The Department may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).

(14) Enforcement: The Department has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

(15) Designated Sampling Schedules: Each public water system shall monitor at the time designated by the Department within each compliance period.

(16) SOC Detection Limits: Detection as used in 310 CMR 22.07A(5) shall be defined as greater than or equal to the following concentrations for each contaminant. (Please refer to the Guidelines and Policies for further information regarding detection limits).

SOC DETECTION LIMITS

<u>Contaminant</u>	<u>Detection Limit mg/l</u>
Alachlor	0.0002
Aldicarb	0.0005
Aldicarb sulfoxide	0.0005
Aldicarb sulfone	0.0008
Atrazine	0.0001
Benzo(a)pyrene	0.00002
Carbofuran	0.0009
Chlordane	0.0002
Dalapon	0.001
Dibromochloropropane (DBCP)	0.00002
Di (2-ethylhexyl) adipate	0.0006
Di (2-ethylhexyl) phthalate	0.0006
Dinoseb	0.0002
Diquat	0.0004
2,4-D	0.0001
Endothall	0.009
Endrin	0.00001
Ethylene dibromide (EDB)	0.00001
Glyphosate	0.006
Heptachlor	0.00004
Heptachlor epoxide	0.00002
Hexachlorobenzene	0.0001
Hexachlorocyclopentadiene	0.0001
Lindane	0.00002
Methoxychlor	0.0001

22.07A: continued

SOC DETECTION LIMITS - continued

<u>Contaminant</u>	<u>Detection Limit mg/l</u>
Oxamyl	0.002
Picloram	0.0001
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	0.0001
Pentachlorophenol	0.00004
Simazine	0.00007
Toxaphene	0.001
2,3,7,8-TCDD (Dioxin)	0.000000005
2,4,5-TP (Silvex)	0.0002

(17) SYNTHETIC ORGANIC BATs: The EPA Administrator, pursuant to Section 1412 of the federal Safe Drinking Water Act, has identified as indicated in the Table below either granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in 310 CMR 22.07A(1):

BAT FOR ORGANIC CONTAMINANTS LISTED IN 310 CMR 22.07A(1)

<u>CAS #</u>	<u>Chemical</u>	<u>GAC</u>	<u>PTA</u>	<u>OX</u>
15972-60-8	Alachlor	X		
116-06-3	Aldicarb	X		
1646-88-4	Aldicarb sulfone		X	
1646-87-3	Aldicarb sulfoxide		X	
1912-24-9	Atrazine	X		
50-32-8	Benzo[a]pyrene	X		
1563-66-2	Carbofuran		X	
57-74-9	Chlordane	X		
75-99-0	Dalapon	X		
96-12-8	Dibromochloropropane (DBCP)	X	X	
75-09-2	Dichloreomethane		X	
103-23-1	Di (2-ethylhexyl) adipate	X	X	
117-81-7	Di (2-ethylhexyl) phthalate	X		
88-85-7	Dinoseb	X		
85-00-7	Diquat	X		
94-75-7	2,4-D	X		
72-20-80	Endrin	X		
145-73-3	Endothall	X		
106-93-4	Ethylene Dibromide (EDB)	X	X	
1071-53-6	Glyphosate			X
76-44-8	Heptachlor	X		
1024-57-3	Heptachlor epoxide	X		
118-74-1	Hexachlorobenzene	X		
77-47-3	Hexachlorocyclopentadiene	X	X	
58-89-9	Lindane	X		
72-43-5	Methoxychlor	X		
1336-36-3	Polychlorinated biphenyls(PCB)		X	
23135-22-0	Oxamyl (Vydate)	X		

22.07A: continued

BAT FOR ORGANIC CONTAMINANTS LISTED IN 310 CMR 22.07A(1)

<u>CAS #</u>	<u>Chemical</u>	<u>GAC</u>	<u>PTA</u>	<u>OX</u>
87-86-5	Pentachlorophenol	X		
1918-02-1	Picloram	X		
93-72-1	2,4,5-TP (Silvex)	X		
122-34-9	Simazine	X		
120-82-1	1,2,4-Trichlorobenzene	X	X	
79-00-5	1,1,2-Trichloroethane	X	X	
1746-01-6	2,3,7,8-TCDD(Dioxin)	X		
8001-35-2	Toxaphene	X	X	

22.07B: Maximum Contaminant Levels (MCLs) for Volatile Organic Compounds (VOC)

(1) Volatile Organic MCLs: The following maximum contaminant levels for organic contaminants apply to community and non-transient, non-community water systems.

<u>CAS No.</u>	<u>Contaminant</u>	<u>MCL (mg/l)</u>
(a) 75-01-4	Vinyl chloride	0.002
(b) 71-43-2	Benzene	0.005
(c) 56-23-5	Carbon tetrachloride	0.005
(d) 107-06-2	1,2-Dichloroethane	0.005
(e) 79-01-6	Trichloroethylene	0.005
(f) 106-46-7	para-Dichlorobenzene	0.005
(g) 75-35-4	1,1-Dichloroethylene	0.007
(h) 71-55-6	1,1,1-Trichloroethane	0.2
(i) 156-59-2	cis-1,2-Dichloroethylene	0.07
(j) 78-87-5	1,2-Dichloropropane	0.005
(k) 100-41-4	Ethylbenzene	0.7
(l) 108-90-7	Monochlorobenzene	0.1
(m) 95-50-1	o-Dichlorobenzene	0.6
(n) 100-42-5	Styrene	0.1
(o) 127-18-4	Tetrachloroethylene	0.005
(p) 108-88-3	Toluene	1
(q) 156-60-5	trans-1,2-Dichloroethylene	0.1
(r) 1330-20-7	Xylenes (total)	10
(s) 75-09-2	Dichloromethane	0.005
(t) 120-82-1	1,2,4-Trichlorobenzene	0.07
(u) 79-00-5	1,1,2-Trichloroethane	0.005

(2) VOC Sampling Requirements: Beginning with the initial compliance period analysis of the contaminants listed in 310 CMR 22.07B(1) for the purpose of determining compliance with the maximum contaminant level the monitoring shall be conducted as follows:

(a) VOC Ground Water Monitoring Protocols: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). If conditions warrant, the Department may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determines consumer exposure. Each sample must be taken at the same sampling point unless the Department determine that conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.

(b) VOC Surface Water Monitoring Protocols: Surface water systems (or combined surface/ground) shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). If conditions warrant, the Department may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determines consumer exposure. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.

22.07B: continued

- (c) Multiple Sources: If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).
 - (d) Initial VOCs Sampling Frequency: Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in 310 CMR 22.07B(1) during each compliance period, beginning in the initial compliance period.
 - (e) VOC Grandfathered Data with No Detects - Reduced Monitoring: If the initial monitoring for contaminants listed in 310 CMR 22.07B(1) as allowed in 310 CMR 22.07B(10), has been completed by December 31, 1992, and the system did not exceed the detection levels in 310 CMR 22.07B(4) any contaminant listed in 310 CMR 22.07B(1), then each ground and surface water system shall take one sample annually beginning with the initial compliance period.
 - (f) Reduced VOC Sampling - Annually: Groundwater and surface water systems which do not detect one of the contaminants listed in 310 CMR 22.07B(1) after conducting the initial round of monitoring required in 310 CMR 22.07B(2)(a)&(b) shall take one sample annually.
 - (g) Reduced VOC Sampling - Every Three Years: After a minimum of three years of annual sampling, the Department may allow systems which have no previous detection of any contaminant listed in 310 CMR 22.07B(1) to take one sample during each compliance period. (One sample every three years).
- (3) VOC Sampling Waivers: Each community and non-transient non-community system which does not detect a contaminant listed in 310 CMR 22.07B(1) may apply to the Department for a waiver from the requirements of 310 CMR 22.07B(2)(d) and (f) and 310 CMR 22.07B(10) after completing the initial monitoring. (For the purposes of 310 CMR 22.07B, detection is defined as ≥ 0.0005 mg/l.) A waiver shall be effective for no more than three years (one compliance period).
- (a) Basis of a VOC Sampling Waiver: A Department may grant a waiver after evaluating the following factor(s):
 - 1. Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the State reveals no previous use of the contaminant within the watershed or Zone II or IWPA, a waiver may be granted.
 - 2. If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.
 - a. Previous analytical results.
 - b. The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.
 - c. The environmental persistence and transport of the contaminants.
 - d. The number of persons served by the public water system and the proximity of a smaller system to a larger system.
 - e. How well the water source is protected against contamination, such as whether it is a surface or groundwater system and other protective measures considered relevant by the Department. Groundwater systems must consider factors such as depth of the well, the type of soil, and wellhead protection. Surface water systems must consider watershed protection.
 - (b) VOC Waiver Requirements for GW Systems: As a condition of the waiver a groundwater system must take one sample at each sampling point during the time the waiver is effective (i.e., one sample during one compliance period or three years) and update its vulnerability assessment considering the factors listed in 310 CMR 22.07B(3)(a). Based on this vulnerability assessment the Department must reconfirm that the system is non-vulnerable. If the Department does not make this reconfirmation within three years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in 310 CMR 22.07B(10)(a).

22.07B: continued

(c) VOC Waiver Requirements for SW Systems: Each community and non-transient non-community surface water system which does not detect a contaminant listed in 310 CMR 22.07B(1) may apply to the Department for a waiver from the requirements of 310 CMR 22.07B(2)(a) after completing the initial monitoring. Systems meeting this criteria must be determined by the Department to be non-vulnerable based on a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the Department.

(4) Detection of a VOC:

(a) If a contaminant listed in 310 CMR 22.07B(1) is detected at a level exceeding 0.0005 mg/l in any sample, then:

1. The system shall report to the Department within seven days and shall monitor quarterly at each sampling point which resulted in a detection.
2. The Department may decrease the quarterly monitoring requirement specified in 310 CMR 22.07B(4)(a)1. provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Department make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.
3. If the Department determines that the system is reliably and consistently below the MCL, the Department may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result or as specified by the Department.
4. Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Department for a waiver as specified in 310 CMR 22.07B(3).
5. Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the Department may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period.

(b) Detection Of a VOC Other Than Those Listed In 310 CMR 22.07B(1): Systems which detect any VOC contaminants at any level shall report the results to the Department.

(c) VOCs Reliably & Consistently Below the MCL: Systems which violate the requirements of 310 CMR 22.07B(1), as determined by 310 CMR 22.07B(7), must monitor quarterly. After a minimum of four consecutive quarterly samples which show the system is in compliance as specified in 310 CMR 22.07B(7) the system demonstration and the Department determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in 310 CMR 22.07B(4)(a)3.

(5) VOC Confirmation Samples: The Department may require a confirmation sample for positive or negative results. The results of the confirmation sample must be averaged with the first sampling result and the average is used for the compliance determination as specified by 310 CMR 22.07B(7). The Department has the discretion to delete results of obvious sampling errors from this calculation.

(6) VOC Composite Samples: The total number of samples a system must analyze may be reduced, with the Department's approval, by the compositing of samples. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL and none of the samples to be composited are representative of multiple sources. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection. Compositing of sources with previous detections exceeding the detection limit is not allowed, unless otherwise authorized by the Department.

22.07B: continued

- (a) If the concentration in the composite sample is ≥ 0.0005 mg/l for any contaminant listed in 310 CMR 22.07B(1), then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.
 - (b) If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the Department within 14 days of collection.
 - (c) Compositing will be permitted at sampling points within a single system, unless the population served by the system is $\leq 3,300$ persons. In systems serving $\leq 3,300$ persons, compositing is permitted with the Department's approval among different systems provided the 5-sample limit is maintained.
 - (d) Compositing samples prior to GC analysis.
 - 1. Add 5 ml or equal larger amounts of each sample (up to five samples are allowed) to a 25 ml glass syringe. Special precautions must be made to maintain zero headspace in the syringe.
 - 2. The samples must be cooled at 4°C during this step to minimize volatilization losses.
 - 3. Mix well and draw out a 5-ml aliquot for analysis.
 - 4. Follow sample introduction, purging, and desorption steps described in the method.
 - 5. If less than five samples are used for compositing, a proportionately small syringe may be used.
 - (e) Compositing samples prior to G/MS analysis.
 - 1. Inject 5-ml or equal larger amounts of each aqueous sample (up to five samples are allowed) into a 25-ml purging device using the sample introduction technique described in the method.
 - 2. The total volume of the sample in the purging device must be 25 ml.
 - 3. Purge and desorb as described in the method.
- (7) VOC Compliance Calculations: Compliance with 22.07B(1) shall be determined based on the analytical results obtained at each sampling point.
- (a) Annual or Greater: For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately.
 - (b) Annually or Less: If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Department, the determination of compliance will be based on the average of two samples.
 - (c) Enforcement: The Department has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.
 - (d) Average Exceeding VOC MCLs: When the average of four analyses made pursuant to 310 CMR 22.07B(4), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.
- (8) VOC Analytical Methods: Analysis for the contaminants listed in 22.07B(1) shall be conducted using the following EPA methods or their equivalent as approved by EPA. Methods 502.2 is in *Methods for the Determination of Organic Compounds in Drinking Water*, EPA-600/4-88-039, December 1988, Revised, July 1991. Methods 524.2 is in *Methods for the Determination of Organic Compounds in Drinking Water - Supplement II*, EPA/600/r-92/129, August 1992.
- (a) Method 502.1, "Volatile Halogenated Organic Chemicals in Water by Purge and Trap Gas Chromatography."

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(b) Method 502.2, "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series."

(c) Method 503.1, "Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography." (This method effective until July 1, 1996)

(d) Method 524.1, "Measurement of Purgeable Organic Compounds in Water by Purged Column Gas Chromatography/Mass Spectrometry." (This method effective until July 1, 1996)

(e) Method 524.2, "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry."

(9) Reserved

(10) Grandfathered VOC Data: The Department may allow the use of monitoring data collected after January 1, 1988, for purposes of complying with initial compliance period. If the data are generally consistent with the other requirements in 310 CMR 22.07B, the Department may use these data (i.e., a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of 310 CMR 22.07B(2)(d). Systems which use grandfathered samples and did not detect any contaminants listed in 310 CMR 22.07B(1) shall begin monitoring annually in accordance with 310 CMR 22.07B(2)(e) beginning with the initial compliance period.

(11) Increased VOC Sampling: The Department may increase required monitoring where necessary to detect variations within the system.

(12) VOC Sampling Schedules: Each public water system shall monitor at the time designated by the Department within each compliance period.

(13) Consecutive System Monitoring: Public water systems that obtain water from another public water system are exempt from conducting compliance monitoring for the purchased portion of the system for the volatile organic chemicals under 310 CMR 22.07B, provided that the system from which the water is obtained has conducted the analyses required under 310 CMR 22.07B, unless otherwise specified by the Department.

(14) Volatile Organic BATs: The Department hereby identifies as indicated in the Table below either granular activated carbon (GAC), packed tower aeration (PTA), or both as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in 310 CMR 22.07B(a) and (c):

BAT FOR ORGANIC CONTAMINANTS			
<u>CAS #</u>	<u>Chemical</u>	<u>GAC</u>	<u>PTA</u>
71-43-2	Benzene	X	X
56-23-5	Carbon tetrachloride	X	X
95-50-1	o-Dichlorobenzene	X	X
107-06-2	1,2-Dichloroethane	X	X
156-59-2	cis-1,2-Dichloroethylene	X	X
156-60-5	trans-1,2-Dichloroethylene	X	X
75-35-4	1,1-Dichloroethylene	X	X
78-87-5	1,2-Dichloropropane	X	X
100-41-4	Ethylbenzene	X	X
108-90-7	Monochlorobenzene	X	X
106-46-7	para-Dichlorobenzene	X	X
100-42-5	Styrene	X	X
127-18-4	Tetrachloroethylene	X	X
71-55-6	1,1,1-Trichloroethane	X	X
79-01-6	Trichloroethylene	X	X
108-88-3	Toluene	X	
75-01-4	Vinyl chloride		X
1330-20-7	Xylene	X	X

22.07C: Unregulated Inorganic and Organic Chemicals Special Monitoring

(1) Monitoring for Unregulated Organic and Inorganic Contaminants: The Monitoring frequency for the contaminants listed in 310 CMR 22.07C(5), (7) and (8) shall be as follows.

(a) Sampling for Synthetic Organic Contaminants: Each community and non-transient, non-community water system shall take four consecutive quarterly samples at each sampling point for each contaminant listed in 310 CMR 22.07C(7) and report the results to the Department. Monitoring must be completed by December 31, 1995.

(b) Sampling for Inorganic Contaminants: Each community and non-transient non-community water system shall take one sample at each sampling point for each contaminant listed in 310 CMR 22.07C(8) and report the results to the Department. Monitoring must be completed by December 31, 1995.

(c) Sampling for Volatile Organic Contaminants: Each community and non-transient non-community water system shall take one sample at each sampling point for each contaminant listed in 310 CMR 22.07C(5) and report the results to the Department. Monitoring must be completed by December 31, 1995.

(2) Sampling Locations: The sampling for the contaminants listed in 310 CMR 22.07C shall be conducted as follows:

(a) Ground Water Sampling Protocols: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) Surface Water Sampling Protocols: Surface water systems including, but not limited to surface water systems with a combination of surface and ground sources shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources: If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

(d) Confirmation Sampling: The Department may require a confirmation sample for positive or negative results.

(e) Composite Sampling: The Department may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and the composite sample must be analyzed within 14 days of collection and comply with 310 CMR 22.07B(6)(a) through (e). If the population served by the system is >3,300 persons, then compositing may only be permitted by the Department at sampling points within a single system. In systems serving ≤3,300 persons, the Department may permit compositing among different systems provided the 5-sample limit is maintained.

(3) Small System Exemptions: Instead of performing the monitoring required by 310 CMR 22.07C, a community water system or non-transient non-community water system serving fewer than 150 service connections or 250 persons may send a letter to the Department stating that the system is available for sampling. This letter must be sent to the Department by January 1, 1994. The system shall not send such samples to the Department, unless requested to do so by the Department.

(4) Sampling Waivers: Each community and non-transient non-community water system may apply to the Department for a waiver from the requirements of 310 CMR 22.07C(1)(a), (b) and (c).

22.07C: continued

(a) Basis of Sampling Waivers: The Department may grant a waiver for the monitoring requirement of 310 CMR 22.07C(5) based on the criteria specified in 310 CMR 22.07B(3)(a). Waivers for monitoring requirements of 310 CMR 22.07C(7) are based on the criteria specified in 310 CMR 22.07A(4)(a). The Department may grant a waiver from the requirement of 310 CMR 22.07C(8) if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.

(5) Unregulated VOC Contaminants:

- (a) Chloroform
- (b) Bromodichloromethane
- (c) Chlorodibromomethane
- (d) Bromoform
- (e) m-Dichlorobenzene
- (f) Dibromomethane
- (g) 1,1-Dichloropropene
- (h) 1,1-Dichloroethane
- (i) 1,1,2,2-Tetrachloroethane
- (j) 1,3-Dichloropropane
- (k) Chloromethane
- (l) Bromomethane
- (m) 1,2,3-Trichloropropane
- (n) 1,1,1,2-Tetrachloroethane
- (o) Chloroethane
- (p) 2,2,-Dichloropropane
- (q) o-Chlorotoluene
- (r) p-Chlorotoluene
- (s) Bromobenzene
- (t) 1,3-Dichloropropene
- (u) 1,2,4-Trimethylbenzene
- (v) 1,2,3-Trichlorobenzene
- (w) n-Propylbenzene
- (x) n-Butylbenzene
- (y) Naphthalene
- (z) Hexachlorobutadiene
- (aa) 1,3,5-Trimethylbenzene
- (bb) p-Isopropyltoluene
- (cc) Isopropylbenzene
- (dd) Tert-butylbenzene
- (ee) Sec-butylbenzene
- (ff) Fluorotrichloromethane
- (gg) Dichlorodifluoromethane
- (hh) Bromochloromethane

(6) EPA Analytical Methods for unregulated VOC contaminants: Analysis for the contaminants listed in 310 CMR 22.07C(5) shall be conducted using the recommended EPA methods as follows, or their equivalent as determined by EPA: 502.1 "Volatile Halogenated organic Compounds in Water By Purge and Trap Gas Chromatography," 503.1, "Volatile Aromatic and Unsaturated Organic Compounds in Water by purge and Trap Gas Chromatography," 524.1, "Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography/Mass Spectrometry," 524.2, "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography/Mass Spectrometry, or 502.2. " Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series." These methods are contained in "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Sources Water." September 1986, available from the Drinking Water Public Docket or the National Technical Information Service (HTIS), NTIS PB91-231480 and PB91-146027, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-336-4700. Effective July 1, 1996 the Analysis for the contaminants listed in 310 CMR 22.07C(5) shall be conducted using the methods at 310 CMR 22.07B(8).

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(7) Unregulated Synthetic Organic Contaminants and Analytical Methods:

<u>Synthetic Organic Contaminants</u>	<u>EPA Analytical Method</u>
(a) Aldrin	505, 508, 508.1, 525.2
(b) Butachlor	507, 525.2
(c) Carbaryl	531.1, 6610
(d) Dicamba	515.1, 515.2, 555
(e) Dieldrin	505, 508, 508.1, 525.2
(f) 3-Hydroxycarbofuran	531.1, 6610
(g) Methomyl	531.1, 6610
(h) Metolachlor	507, 508.1, 525.2
(i) Metribuzin	507, 508.1, 525.2
(j) Propachlor	508, 508.1, 525.2
(k) Aldicarb	531.1, 6610
(l) Aldicarb sulfoxide	531.1, 6610
(m) Aldicarb sulfone	531.1, 6610

(8) Unregulated Inorganic Contaminants and Analytical Methods¹:

<u>Contaminant</u>	<u>Methodology</u>	<u>EPA Method</u>	<u>ASTM</u>	<u>SM</u>
(a) Sulfate				
	Ion Chromatography	300.0	D4327-91	4110
	Automated Colorimetry	375.2		4500-SO ₄ -F
	Gravimetric with Ignition of Residue			4500-SO ₄ -C
	Gravimetric with Drying of Residue			4500-SO ₄ -D

¹ Sources for the Standard Methods and ASTM sulfate methods are referenced at 310 CMR 22.06(15)(a). The EPA methods are contained in "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA/600/R-93/100, August 1993, which is available at NTIS, PB94-121811.

(9) Repeat Monitoring: All community and non-transient, non-community water systems shall repeat the monitoring for contaminants listed in 310 CMR 22.07C(5) (a) through (u) no less frequently than every three years or in accordance with the sampling frequencies in 310 CMR 22.07(B). For those contaminants listed in 310 CMR 22.07C(5) (v) through (hh) and 310 CMR 22.07C(7) and (8), the repeat monitoring shall be at the discretion of the Department.

(10) Grandfathered Data: Public water systems may use monitoring data collected any time after January 1, 1988 to meet the requirements for unregulated monitoring specified in 310 CMR 22.07C(5), provided that the monitoring program was consistent with the requirements of 310 CMR 22.07C.

(11) Analysis under 310 CMR 22.07C shall be conducted by laboratories approved under 310 CMR 42.00, using the recommended EPA methods listed at 310 CMR 22.07A(10).

22.08: Maximum Turbidity Contaminant Levels, Monitoring Requirements and Analytical Methods for Unfiltered Systems and for Filtered Systems Not in Compliance with 310 CMR 22.20A

(1) The maximum contaminant level for turbidity, applicable only to public water systems which use water obtained in whole or in any part from surface water sources, shall be measured at representative entry point(s) to the distribution system, and shall be:

- (a) One turbidity unit, (1 NTU) as determined by a monthly average rounded to the nearest significant whole number pursuant to 310 CMR 22.08(3) except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the Department that the higher turbidity does not do any of the following:
1. Interfere with disinfection; or
 2. Prevent maintenance of an effective disinfectant agent throughout the distribution system; or
 3. Interfere with microbiological determinations.

22.08: continued

- (b) Five turbidity units, as determined by the arithmetic mean of two consecutive daily samples pursuant to 310 CMR 22.08(3).
- (2) All analyses shall be conducted in accordance with the following methods:
 - (a) Nephelometric Method 2130B, "Standard Methods for the Examination of Water and Wastewater," American Public Health Association, 14th Edition, pages 132-4, inclusive; or
 - (b) Nephelometric Method, Method 180.1, "Methods in the Determination of Inorganic Substances in Environmental Samples" EPA-600/R-93-100, August 1995, Available at NTISPB94-121811.
 - (c) GLI Method 2, "Trubidity" November 2, 1992, Great Lakes Instrumentation, Inc., 8855 North 55th Street, Milwaukee, Wisconsin
- (3) In no event shall the frequency of sampling be less than as set forth below:
 - (a) Community water systems subject to 310 CMR 22.08 shall commence sampling by not later than June 24, 1977 and shall take at least one sample per day thereafter. All samples shall be taken at representative entry point(s) to the distribution system.
 - (b) NonCommunity water systems subject to 310 CMR 22.08 shall commence sampling by not later than June 24, 1979 and shall take at least one sample per day thereafter. All samples shall be taken at representative entry point(s) to the distribution system.
 - (c) If the result of a turbidity analysis pursuant to 310 CMR 22.08(3)(a) and 22.08(3)(b) indicates that the maximum contaminant level has been exceeded, the sampling and measurement shall be confirmed by resampling as soon as practicable and preferably within one hour. If the repeat sample confirms that the maximum contaminant level has been exceeded, the supplier of water shall report to the Department within 48 hours. The repeat sample shall be the sample used for calculating the monthly average pursuant to 310 CMR 22.08(3)(a) and 22.08(3)(b). If the monthly average of the daily samples exceeds one turbidity unit, or if the average of two consecutive daily samples exceeds five turbidity units, the supplier of water shall notify the public pursuant to 310 CMR 22.16.
 - (d) If the Department determines that a reduced sampling frequency in a noncommunity system will not pose a risk to public health, it can reduce the required sampling frequency. The option of reducing the turbidity frequency shall be permitted only in those public water systems that practice disinfection and which maintain an active residual disinfectant in the distribution system, and in those cases where the Department has indicated in writing that no unreasonable risk to health existed under the circumstances of this option.
- (4) The requirements in 310 CMR 22.08 apply to unfiltered systems that the Department has determined in writing that filtration is required. The requirements in 310 CMR 22.08 also apply to filtered systems until such time that said systems are in compliance with 310 CMR 22.20A. The requirements for unfiltered systems that have met the criteria for avoiding filtration must comply with 310 CMR 22.20A.

22.09: Maximum Radionuclide Contaminant Levels, Monitoring Requirements and Analytical Methods

The maximum contaminant levels, sampling requirements and associated monitoring requirements for radionuclides, applicable only to community water systems, shall be as follows:

- (1) For radium-226, radium-228 and gross alpha particle radioactivity
 - (a) The maximum contaminant level shall be based on the analysis of an annual composite of four consecutive quarterly samples or the average of the analyses of four samples obtained at quarterly intervals. The required sensitivity of analyses shall be defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus 100% at the 95% confidence level (where 1.96 is the standard deviation of the net counting rate of the sample). The maximum contaminant level shall be
 - 1. For combined radium-226 and radium-228, 5 pCi per liter. In no event shall the detection limit exceed 1 pCi per liter.
 - 2. For gross alpha particle activity, including radium-226 but excluding radon and uranium, 15 pCi per liter. In no event shall the detection limit exceed 3 pCi per liter.

22.09: continued

(b) Sampling and analysis shall be done as follows:

1. All samples shall be taken at the free flowing outlet of the ultimate user of the community water system, as approved by the Department. In addition, when so ordered by the Department, a community water system using two or more sources having different concentrations of radioactivity shall monitor source water. Each analysis shall be based on either an annual composite of four consecutive quarterly samples or the average of the analyses of four samples obtained at quarterly intervals. All data shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

a. A gross alpha particle activity measurement may be substituted for the required radium-226 and radium-228 analysis, but only if the measured gross alpha particle activity does not exceed 5 pCi per liter at a confidence level of 95% (1.65 where is the standard deviation of the net counting rate of the sample). In localities where radium-228 may be present in drinking water, radium-226 and/or radium-228 analyses shall be required when the gross alpha particle activity exceeds 2 pCi per liter.

b. When the gross alpha particle activity exceeds 5 pCi per liter, the same or an equivalent sample shall be analyzed for radium-226. If the concentration of radium-226 exceeds 3 pCi per liter, the same or an equivalent sample shall be analyzed for radium-228.

2. The frequency of sampling shall in no event be less than as set forth below:

a. Community water systems shall begin initial sampling by no later than June 24, 1979 and shall complete such sampling by no later than June 24, 1980. At the discretion of the Department, data acquired after June 24, 1976 may be substituted for the initial analysis required herein.

b. Community water systems shall conduct repeat analyses at least once every four years. At the discretion of the Department when the initial analysis taken in conformance with 310 CMR 22.09(1)(c)2.a. has established that the average annual concentration is less than half the maximum contaminant level established by 310 CMR 22.09(1)(a), analysis of a single sample may be substituted for the quarterly sampling procedure otherwise required by 310 CMR 22.09(1)(c)1. More frequent monitoring than once every four years shall be conducted, when ordered by the Department, in the vicinity of mining or other operations which may contribute alpha particle radioactivity to either surface or ground water sources of drinking water. A community water system shall conduct an analysis pursuant to 310 CMR 22.09(1)(c)1. within one year of the introduction of a new water source for said system. More frequent monitoring shall be conducted when ordered by the Department in the event of possible contamination by radioactivity in finished water. If the average annual concentration of radium-228 has been assayed at least once using the quarterly sampling procedure required by 310 CMR 22.09(1)(c)1., repeat monitoring after the initial analysis need not include radium-228, except when otherwise ordered by the Department. When so ordered by the Department, suppliers of water shall conduct annual monitoring of any community water system in which the radium-226 concentration exceeds three pCi per liter.

c. If the maximum contaminant level for gross alpha particle activity or total radium is exceeded, the community water system shall give notice to the Department pursuant to 310 CMR 22.15 and shall notify the public as required by 310 CMR 22.16. Monitoring at quarterly intervals shall be continued until the annual average concentration no longer exceeds the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption, or enforcement action shall become effective.

(2) For beta particle and photon radioactivity from man-made radionuclides

(a) The maximum contaminant level shall be the average annual concentration which produces an annual dose equivalent to the total body or any internal organ greater than four millirem per year. The concentration of tritium causing a four millirem per year dose equivalent in the total body shall be calculated on the basis of 20,000 pCi per liter. The concentration of strontium-90 causing a four millirem per year dose equivalent in the bone marrow shall be calculated on the basis of eight pCi per liter. The concentration of all other man-made radionuclides causing a four millirem per year total body or organ dose equivalent

22.09: continued

shall be calculated on the basis of a two liter per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure", NBS Handbook 69 as amended August 1963, U.S. Department of Commerce. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed four millirem per year. The maximum contaminant level shall be based on either analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The required sensitivity of analyses shall be defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus 100% at the 95% confidence level (1.96 where is the standard deviation of the net counting rate of the sample). In no event shall the detection limit exceed

1. For tritium, 1,000 pCi per liter.
 2. For strontium-89, 10 pCi per liter.
 3. For strontium-90, 2 pCi per liter.
 4. For iodine-131, 1 pCi per liter.
 5. For cesium-134, 10 pCi per liter.
 6. For gross beta, 4 pCi per liter.
 7. For all other radionuclides, 1/10 of the applicable limit.
- (b) Sampling and analysis shall be done as follows:
1. All samples shall be taken at the free flowing outlet of the ultimate user of the community water system, as approved by the Department. These sampling and analysis requirements shall apply to all community water systems using surface water sources in whole or in any part and serving more than 100,000 persons, and all other community water systems which the Department may designate. In addition, supplies of water shall conduct monitoring, as ordered by the Department to determine the concentration of man-made radioactivity in principal watersheds designated by the Department. Each analysis shall be based on either analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. All data shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question. If gross beta particle activity exceeds 50 pCi per liter, an analysis of the sample shall be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance with 310 CMR 22.09(2)(a).
 2. The frequency of sampling shall in no event be less than as set forth below:
 - a. Except as provided in 310 CMR 22.09(2)(c)2.c., community water systems shall begin initial sampling by not later than June 24, 1979 and shall complete such sampling by not later than June 24, 1980. At the discretion of the Department, data acquired after June 24, 1976 may be substituted for the initial analysis required herein.
 - b. Except as provided in 310 CMR 22.09(2)(c)2.c., community water systems shall conduct repeat analyses at least once every four years. Compliance with 310 CMR 22.09(2)(a) may be assumed without repeat analysis if the average annual concentration of gross beta particle activity is less than 50 pCi per liter and if the average annual concentrations of tritium and strontium-90 are less than those prescribed in 310 CMR 22.09(2)(a), provided that if both tritium and strontium-90 are present the sum of their annual dose equivalents to bone marrow shall not exceed four millirem per year.
 - c. By not later than June 24, 1979 the supplier of water of any community water system designated by the Department as utilizing waters contaminated by effluent from nuclear facilities shall initiate quarterly monitoring for gross beta particle and iodine-131 radioactivity and annual monitoring for strontium-90 and tritium. Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples, or with the express written permission of the Department a composite of three monthly samples. If the gross beta particle activity in a sample exceeds 15 pCi per liter, the same or an equivalent sample shall be analyzed for strontium-89 and cesium-134. If the gross beta particle activity exceeds 50 pCi per liter, an analysis of the sample shall be performed to identify the major radioactive

22.09: continued

constituents present and the appropriate organ and total body doses shall be calculated to determine compliance with 310 CMR 22.09(2)(a). Quarterly monitoring for iodine-131 shall be based on a composite of five consecutive daily samples which shall be analyzed once each quarter. As ordered by the Department, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water. Annual monitoring for strontium-90 and for tritium shall be conducted by analysis of four quarterly samples, or with the express written permission of the Department a composite of four consecutive quarterly samples. The Department may in its discretion allow the substitution of environmental surveillance data taken in conjunction with a nuclear facility for direct monitoring of man-made radioactivity by the supplier of water where the Department determines such data is applicable to a particular community water system.

d. If any maximum contaminant level set forth in 310 CMR 22.09(2)(a) is exceeded, the community water system shall give notice to the Department pursuant to 310 CMR 22.15 and shall notify the public pursuant to 310 CMR 22.16. Monitoring at monthly intervals shall be continued until the concentration does not exceed the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption, or enforcement action shall become effective.

(3) EPA Analytical Methods for Radionuclide Contaminants: All analyses shall be made in accordance with the following methods

		<u>REFERENCES (METHOD OR PAGE NUMBERS)</u>				
<u>Contaminant</u>	<u>Methodology</u>	<u>EPA¹</u>	<u>EPA²</u>	<u>EPA³</u>	<u>EPA⁴</u>	
<i>Naturally Occurring:</i>						
Gross Alpha & Beta	Evaporation	900.0	pp. 1-3	00-01	p. 1	
Gross Alpha	Co-precipitation			00-02		
Radium 226	Radon Emanation	903.1	pp. 16-23	Ra-03	p. 19	
	Radiochemical	903.0		Ra-05		
Radium 228	Radiochemical	904.0	pp. 24-28	Ra-05	p. 19	
Radon 222	Liquid Scintillation					
	Lucas Cell					
Uranium	Radiochemical	908.0				
	Fluorometric	908.1				
	Alpha Spectrometry			00-07	p. 33	
<i>Man-Made:</i>						
Radioactive Cesium	Precipitation	901.0	pp. 4-5			
Radioactive Iodine	Precipitation	902.0			1-01	
Radioactive Strontium 89,90	Precipitation	905.0	pp. 29-33		p. 65	
	Radiochemical		pp. 108-114	Sr-04		
Tritium	Liquid Scintillation	906.0	pp. 34-40	H-02	p. 87	
Gamma & Photon Emitters	Gamma Ray Spectrometry	901.1				
<u>Contaminant</u>	<u>Methodology</u>	<u>SM⁵</u>	<u>ASTM⁶</u>	<u>USGS⁷</u>	<u>DOE⁸</u>	<u>Other</u>
<i>Naturally Occurring:</i>						
Gross Alpha & Beta	Evaporation	7110 B	D 1943-81	R-1120-76		
Gross Alpha	Co-precipitation					
Radium 226	Radon Emanation	7500-Ra B	D 3454-86	R-1141-76		*N.Y.
	Radiochemical					
Radium 228	Radiochemical	7500-Ra D*	R-1142-76			*N.Y., *N.J.
Radon 222	Liquid Scintillation					
	¹¹⁹ 13, ¹² LS					
	Lucas Cell					¹² LC
Uranium	Radiochemical	7500-U B	D 3972-82			
	Fluorometric	7500-U C	D 2907-83	R-1180-76	E-U-03	
	Alpha Spectrometry			R-1182-76	E-U-04	

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<u>Contaminant</u>	<u>Methodology</u>	<u>SM</u> ⁵	<u>ASTM</u> ⁶	<u>USGS</u> ⁷	<u>DOE</u> ⁸	<u>Other</u>
<i>Man-Made:</i>						
Radioactive Cesium	Precipitation	7500-Cs B		R-1110-76	E-Cs-01	
Radioactive Iodine	Precipitation	7500-I B	D 2334-88			
Radioactive Strontium	Precipitation	7500-Sr B		R-1160-76		
89,90	Radiochemical				E-Sr-01	
Tritium	Liquid Scintillation		7500-3H	D 2476-81	R-1171-76	
		B	(87)			
Gamma and Photon Emitters	Gamma Ray Spectrometry		D-3649-85		4.5.2.3	

¹"Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA Environmental Monitoring and Support Laboratory, Cincinnati, OH (EPA-600/4-80-032, August 1980. (EPA, 1980)

²"Interim Radiochemical Methodology for Drinking Water," EPA-600/4-75-008, March 1976. (EPA 1976)

³Eastern Environmental Radiation Facility, Montgomery, AL 36109. "Radiochemical Procedures Manual," EPA 520/5-84-006, August 1984. (EPA, 1984a)

⁴"Radiochemical Analytical Procedures for Analysis of Environmental Samples," EMSL-LV-0539-17. March 1979. (EPA, 1979b)

⁵"Standard Methods for the Examination of Water and Wastewater," 17th edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1989. (APHA, 1989)

⁶1989 Annual Book of ASTM Standards, Vol. 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA. 19103. (ASTM, 1989)

⁷Methods for Determination of Radioactive Substances in Water and Fluvial Sediments," Book 5, 1989, Techniques of Water-Resources Investigations of the United States Geological Survey, Chapter A5. (USGS, 1989)

⁸Environmental Measurements Laboratory, U.S. Department of Energy, "EML PROCEDURES MANUAL, 27th edition." (DOE, 1990)

⁹"Determination of ²²⁶Ra and ²²⁸Ra (Ra-02), Radiological Sciences Institute Center for Research-New York State Department of Health, January 1980 (Revised June 1982). (NY State DOH, 1982)

¹⁰"Determination of Radium 228 in Drinking Water," State of New Jersey-Department of Environmental Protection-Division of Environmental Quality-Bureau of Radiation and Inorganic Analytical Services, August 1990. (NJ DEQ, 1990)

¹¹Method 913-Radon in drinking water by liquid scintillation, "Environmental Monitoring and Support Laboratory. Las Vegas, NV. (EPA, 1991q)

¹²Appendix D, Analytical Test Procedure, "The Determination of Radon in Drinking Water," p. 22. Two Test Procedures for Radon in Drinking Water, Interlaboratory Collaborative Study. EPA/600/2-87/082. March 1987. (EPA, 1987e)

22.10: Alternative Analytical Methods

With the express written permission of the Department, given after a public hearing and the approval of the Administrator or the Administrator's designee, an alternate analytical technique may be employed for any analytical technique prescribed in 310 CMR 22.00. The Department shall give such permission only if the alternative technique is substantially equivalent to the prescribed test in both precision and accuracy as it relates to the determination of compliance with any maximum contaminant level. The use of the alternative analytical technique shall not decrease the frequency of monitoring required by 310 CMR 22.00.

22.11A: Laboratory Certification

(1) No laboratory shall conduct the analyses of drinking water required by 310 CMR 22.00 nor report them to the supplier of water or to the Department for the purpose of complying with 310 CMR 22.00 unless the Department has certified the laboratory to conduct analytical measurements, pursuant to 310 CMR 42.00 except that measurements of turbidity, free chlorine residual, temperature, pH, and other analyses for the control of treatment works for public water systems may be performed by any employee or agent of the public water system whom the Department designates as competent and authorized to perform such analyses. No sample shall be considered for the purpose of determining compliance with 310 CMR 22.00 if the sample was

22.11A: continued

analyzed by a laboratory not certified pursuant to 310 CMR 42.00, or analyzed by an unapproved analytical method. All sample results submitted to the Department shall be on forms specified and approved by the Department. Certified laboratories, or other agents approved by the Department, shall provide collection containers of the recommended size, quality and construction for the collection of drinking water samples, as well as any required preservative.

(2) The Department may accept results of analyses performed by laboratories which are certified by the EPA. Such laboratories must continue to participate in performance evaluation studies and in laboratory intercomparison cross check studies which include the analyses for which the laboratory is certified or seeking certification.

22.11B: Public Water Systems Certified Operator Staffing Requirements

(1) Operation. Every public water system shall be operated at all times by a Primary and Secondary Operator for the treatment and distribution of drinking water, unless otherwise authorized in writing by the Department. Exemptions to this requirement are addressed in 310 CMR 22.11B(5). The Primary Operator shall be directly responsible for the operation of a treatment facility and/or distribution system. The Secondary Operator shall be directly responsible for the operation of a treatment facility and/or distribution system or a major segment of the facility, during the temporary absence of the Primary Operator or during operational shifts when the Primary Operator is not scheduled to work.

Persons exercising official general administrative duties such as city engineers exercising engineering design duties, elected water commissioners, clerks or administrative workers involved in customer relations, billing, payroll, timekeeping, etc. shall not be considered directly responsible for a public water system, unless otherwise authorized in writing by the Department.

(2) Staffing Requirements. In order to ensure the proper management, operation and maintenance of a public water system, every public water system shall be operated as follows:

(a) Treatment - Primary Operator. A public water system utilizing treatment shall be operated for at least one daily working shift per work week by a certified operator who has a certification of grade level at least equal to the classification of the facility during the operation of the treatment facility, unless otherwise authorized in writing by the Department and/or as exempted by 310 CMR 22.11B(5).

(b) Treatment - Secondary Operator. A treatment facility requiring the treatment facility or filtration units to be operational for more than one working shift per work week, shall be operated by a certified operator who shall have a certification not less than one grade lower than the classification of the facility on all shifts when primary operator is not present, unless otherwise authorized in writing by the Department and/or as exempted by 310 CMR 22.11B(5).

(c) Distribution - Primary Operator. Public water systems having a water distribution system shall be operated by a certified operator who has a certification of grade level at least equal to the classification of the distribution portion of the system during at least one daily working shift per work week and shall be available to respond to emergencies within one hour at all other times, unless otherwise authorized in writing by the Department and/or as exempted by 310 CMR 22.11B(5).

(d) Distribution - Secondary Operator. Public water systems having a water distribution system, shall have a certified operator present during at least one daily working shift per work week to serve as the Primary Operator in his/her absence and shall have a certification not less than one grade lower than the classification of the system, unless otherwise authorized in writing by the Department and/or as exempted by 310 CMR 22.11B(5).

(3) Reporting Requirements. Except for periods of temporary absence, whenever a public water supply replaces a certified operator responsible for primary or secondary supervision under 310 CMR 22.11B(1), the public water system purveyor shall report the change to the Department within 24 hours and submit to the Department within 30 days documentation which outlines the procedures to obtain an appropriately certified operator(s). The new operator's name, certification number and duties shall be submitted to the Department once this information is known.

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(4) Classification of Public Water Systems. Each public water system shall be classified by the Department in consultation with the Board of Certification of Operators of Drinking Water Supply Facilities as either VND (Water Vending Machines), VSS (Very Small Systems), Treatment (1T, 2T, 3T and 4T), Distribution (1D, 2D, 3D, and 4D). The increasing numerical class indicates an increasing complexity of operation and a higher level of training, knowledge, and experience required for operation. The certification grades for operators established in 236 CMR 3.02 and 3.04, shall correspond to the classification of the system as required under 310 CMR 22.11B(4).

(a) Rating water treatment plants: The class of a public water system shall be established by adding together all rating values reflecting the complexity of operation for units which are present in the facility, as set forth in 310 CMR 22.11B.

1. A public water system using only disinfection by chlorination is considered a distribution system process, not a treatment facility.
2. Each unit process should have points assigned only once. For example, a facility using oxidation, precipitation and filtration for iron removal, add ten points for the iron removal only and zero for filtration.
3. The overall rating of the public water system shall be based on the highest rated facility.
4. The point rating scale for a treatment facility is as follows:

<u>Item</u>	<u>Points</u>
a. Size of treatment facility (2 to 20)	
i. Maximum system population served, peak day (1 to 10)*	1pt/10,000
ii. Plant design flow average day or peak month's flow average day, whichever is larger (1 to 10)* or part	1 pt/MGD
b. Water Supply source	
i. Groundwater	3
ii. Surface water	5
iii. Average raw water quality	(0 to 10)**
iv. Raw Water Quality (other than turbidity) varies enough to require treatment changes approximately 10% of the time:	2
v. Raw Water quality (turbidity) varies severely enough to require pronounced and/or very frequent treatment changes:	5
vi. Raw water quality subject to periodic serious industrial waste pollution:	10
c. Aeration	2
d. Packed tower aeration	6
e. pH adjustment	4
f. Stability or corrosion control	4
g. Taste and odor control	8
h. Color control	4
i. Iron or iron/manganese removal	10
j. Ion exchange softening	10
k. Chemical precipitation softening	20
l. Coagulant addition	4
m. Flocculation	6
n. Sedimentation	5
o. Upflow clarification	14
p. Filtration	10
q. Fluoridation	5
r. Disinfection (0 to 10)***	
i. No disinfection	0
ii. Chlorination or comparable	5
iii. On-site generation of disinfectant	5
s. Special processes(including reverse osmosis electrodialysis)	15

22.11B: continued

- t. Residuals/backwash water disposal
 - i. No disposal to raw water source 0
(e.g. to sewer or off watershed)
 - ii. Any disposal to raw water source(lagoons) 2
(e.g. supernatant discharge to reservoir)
 - iii. Any disposal to plant raw water 5

*Maximum of 10 points

** The key concept is the variation or change in the quality of the raw water source with point values ranging from 0 to 10. Little or no variation: 0 Points, River source - 10 points.

*** For disinfectants, such as ozone, chloride dioxide or chloramines, assign 5 points for chlorination or comparable and 5 points for on-site generation of disinfectant.

5. Point System: Water treatment facilities shall be classified according to the following points system:

- Class I-T 30 Points and less
- Class II-T 31 to 55 points
- Class III-T 56 to 75 points
- Class IV-T 76 points and greater

(b) Water Vending Machines with Treatment. Free standing vending machines consisting of filters with the addition of chemicals and/or reverse osmosis system shall be classified as follows:

- | | |
|-------------------------------|----------------|
| 2000 gal per day and less | Class I-VNDT |
| 2001 gal per day to 5000 | Class II-VNDT |
| 5001 gal per day to 50000 | Class III-VNDT |
| 50001 gal per day and greater | Class IV-VNDT |

(c) Rating Distribution Systems: Distribution systems shall be rated according to the population served as follows except for non-community public water systems:

- | | |
|--------------------|-------------------------|
| 500 and less | VSS (Very Small System) |
| 501 to 1,500 | Class I-D |
| 1,501 to 15,000 | Class II-D |
| 15,001 to 50,000 | Class III-D |
| 50,001 and greater | Class IV-D |

All non-community water systems shall be classified as Very Small Systems (VSS) regardless of population served.

In-line treatment (such as booster pumping, or chlorination) is considered an integral part of the distribution system.

(d) Water Vending Machines without Treatment. Free standing vending machines consisting of filters, or ultra-violet disinfection systems with no chemical addition shall be classified as follows:

- | | |
|--------------------------|--------------------------------|
| 500 gal per day and less | VND-ID (Water Vending Machine) |
| 501 gal per day and more | VND-IID |

(e) Bulk or Bottled Water: Water that is treated to be distributed in bulk or as bottled water shall be classified as stated in 310 CMR 22.11B(4)(b) and (4)(d) unless otherwise authorized in writing by the Division.

(f) Specific Rating Values The Division may establish a rating value for any system or unit not shown on the table. The Division may change the classification of a particular facility when there are site-specific factors affecting the operation of the public water system or complexity of the treatment process. A public water system facility may be classified at a higher class at the discretion of the Division and after consultation with the Board of Certification of Operators of Drinking Water Supply Facilities.

22.11B: continued

(5) Exemptions: The Department may exempt any public water system from the requirements of 310 CMR 22.11B(1) and (2).

(a) The Department shall not grant any exemptions unless the Department finds all of the following:

1. Due to compelling factors the public water system is unable to comply with the requirements of 310 CMR 22.11B.
2. The granting of an exemption will not result in an unreasonable risk to health or impair the quality of water which is being delivered to the consumers.
3. The ability to detect any malfunctions in the operation of the facility or system in the absence of the Primary Operator.
4. The primary operator is able to respond to emergencies within a reasonable period of time. In no event shall an emergency response time greater than one hour be deemed reasonable.
5. That the Primary Operator is responsible for the operation of the system during his/her absence between scheduled visits and that the persons affiliated with the public water system are acting under the direction of the Primary Operator.

(b) Staffing and Comprehensive Operations Plan: Public water systems requesting an exemption under 310 CMR 22.11B(5) shall submit to the Division for review and approval a staffing and comprehensive operations plan for said system and/or facility.

(c) Part-time Operation. With the prior written approval of the Division, a public water systems classified as a 1D or 1T facility or less may reduce the staffing requirements of 310 CMR 22.11B(1) and (2) by operating the facility on a part-time basis. A public water system seeking a reduction in the staffing requirements shall be subject to the conditions listed at 310 CMR 22.11B(5)(a)1. through 5. and (5)(b). The Primary and Secondary Operators or both may be allowed to operate the treatment facility or distribution system on a part time basis.

(d) Water Treatment Facility - Automated Operations. Increased instrumentation, automation and (SCADA) systems may be used to reduce the number of on-site staff required during periods of routine operation. Public water system which have been designed for off-site monitoring may apply to the Department for exemption from the requirements of 310 CMR 22.11B(1) and (2). Design of treatment facilities utilizing automated controls must also meet the requirement specified in the guidelines and policies if appropriate.

1. The Department shall use, but not be limited to, the following factors in making its determination to evaluate whether a facility or system can reduce the number of staff required to operate a facility or system:

- a. the complexity and type of the treatment process.
- b. the size of storage tanks and clearwells.
- c. the time required to reduce water quality in the distribution system from a treatment process failure,
- d. the variability of source water quality.
- e. the degree of sophistication, reliability and control of the instrumentation monitoring and control system,
- f. the location of the off-site monitoring site with respect to operator travel time to the treatment facility.
- g. the adequacy of the written response plan at the off-site location when alarms or out-of-range parameters are reported by facility instrumentation,
- h. the capabilities of a system or facility to be remotely shut down during an alarm condition, and
- i. the arrangement of piping and storage facilities so that there will be at least 12 hours for the correction of a process malfunction before the distribution system is impacted by the malfunction, and
- j. the ability of improperly treated water to be voided from the water distribution system prior to the first customer without an interruption of water service.

2. The treatment facility or distribution system shall include, but not limited to, instrumentation to continuously measure the following variables:

- a. water storage tank levels at the treatment facility and on the distribution system,
- b. pH, conductivity, turbidity, chlorine residual, and selective ions,

22.11B: continued

- c. effluent turbidity levels.
 - d. effluent chlorine residuals, and
 - e. chemical storage tanks and disinfection equipment.
3. The treatment facility or distribution system shall include, but not limited to, alarms systems for the following:
- a. water storage tank high and low levels at the treatment facility and on the distribution system.
 - b. pH, conductivity, turbidity, chlorine residual, disinfectant equipment, and selective ions within specific ranges,
 - c. chlorine leaks and tank pressure changes.
 - d. distribution system pressure loss, within specific ranges.
 - e. fire and intrusion,
 - f. power failures.
 - g. critical pumps, motors and generators failures, and
 - h. chemical tank shortage volumes (high and low levels).
- (e) 4T Facilities: A treatment facility classified as a 4T and meeting the requirements of 310 CMR 22.11B(5)(d) shall be staffed as follows, with the exception of satellite or seasonal plants as described in 310 CMR 22.11B(7):
- 1. Treatment facilities operating 16 to 24 hours per day will be required to be staffed at a minimum of 16 hours per day during the days when the treatment facility and or filtration units are in operation. The Primary Operator shall staff one work week shift.
 - 2. Treatment facilities operating less than 16 hours per day will be required to be staffed at a minimum of eight hours per day during the days when the treatment facility and/or filtration units are in operation. The Primary Operator shall staff one work week shift.
- (f) 3T Facilities: A treatment facility classified as a 3T and meeting the requirements of 310 CMR 22.11B(5)(d), with the exception of satellite or seasonal facility as described in 310 CMR 22.11B(7), shall be staffed at a minimum of eight hours per day during the days when the treatment facility and/or filtration units are in operation. The Primary Operator shall staff one work week shift.
- (g) 2T Facility or Less: A treatment facility classified as a 2T or less and meeting the requirements of 310 CMR 22.11B(5)(d), with the exception of satellite or seasonal facilities as described in 310 CMR 22.11B(7) shall be staffed at minimum of four hours per day during the days when the treatment facility is in operation. The Primary Operator shall staff one work week shift.
- (h) Slow Sand Filtration - Chemicals: A slow sand filtration process utilizing chemicals and meeting the requirements of 310 CMR 22.11B(5)(d) shall be staffed at a minimum of two hours per day during the days when the filtration process is in operation by the primary operator for one work week shift.
- (i) Very Small Systems and Non Community Public Water Systems. A Secondary Operator is not required for public water systems classified as a very small system (VSS), non-community or non-transient non-community water systems. However, during the times when the Primary Operator is temporarily absent (i.e. absences not exceeding 30 days), a person who has a certification which corresponds to the class of the facility or higher shall be retained during the absence of the Primary Operator to respond in the event of an emergency. In no event shall an emergency response time greater than one hour be deemed reasonable.
- (j) Slow Sand Filtration Non-Chemical: Slow sand filtration not utilizing chemicals may reduce the staffing requirements at 310 CMR 22.11B(1) and (2) by submitting to the Division a staffing and comprehensive operations plan for review and approval.
- (k) River or Streams: No exemptions or waivers from 310 CMR 22.11B shall be granted for filtration facilities, other than slow sand filtration, which treat water drawn directly from rivers or streams. These facilities must be staffed at all time during the days when the filtration units are in operation.
- (6) Contract Services With the prior written approval of the Department, public water systems may contract for the services of a certified operator to meet the requirements of 310 CMR 22.11B (1) and (2) provided that the public water system submit for the Department's approval a staffing and comprehensive operations plan in accordance with 310 CMR 22.11B(5)(b).

22.11B: continued

(5) Exemptions: The Department may exempt any public water system from the requirements of 310 CMR 22.11B(1) and (2).

(a) The Department shall not grant any exemptions unless the Department finds all of the following:

1. Due to compelling factors the public water system is unable to comply with the requirements of 310 CMR 22.11B.
2. The granting of an exemption will not result in an unreasonable risk to health or impair the quality of water which is being delivered to the consumers.
3. The ability to detect any malfunctions in the operation of the facility or system in the absence of the Primary Operator.
4. The primary operator is able to respond to emergencies within a reasonable period of time. In no event shall an emergency response time greater than one hour be deemed reasonable.
5. That the Primary Operator is responsible for the operation of the system during his/her absence between scheduled visits and that the persons affiliated with the public water system are acting under the direction of the Primary Operator.

(b) Staffing and Comprehensive Operations Plan: Public water systems requesting an exemption under 310 CMR 22.11B(5) shall submit to the Division for review and approval a staffing and comprehensive operations plan for said system and/or facility.

(c) Part-time Operation. With the prior written approval of the Division, a public water system classified as a 1D or 1T facility or less may reduce the staffing requirements of 310 CMR 22.11B(1) and (2) by operating the facility on a part-time basis. A public water system seeking a reduction in the staffing requirements shall be subject to the conditions listed at 310 CMR 22.11B(5)(a)1. through 5. and (5)(b). The Primary and Secondary Operators or both may be allowed to operate the treatment facility or distribution system on a part time basis.

(d) Water Treatment Facility - Automated Operations. Increased instrumentation, automation and (SCADA) systems may be used to reduce the number of on-site staff required during periods of routine operation. Public water system which have been designed for off-site monitoring may apply to the Department for exemption from the requirements of 310 CMR 22.11B(1) and (2). Design of treatment facilities utilizing automated controls must also meet the requirement specified in the guidelines and policies if appropriate.

1. The Department shall use, but not be limited to, the following factors in making its determination to evaluate whether a facility or system can reduce the number of staff required to operate a facility or system:

- a. the complexity and type of the treatment process.
- b. the size of storage tanks and clearwells.
- c. the time required to reduce water quality in the distribution system from a treatment process failure,
- d. the variability of source water quality.
- e. the degree of sophistication, reliability and control of the instrumentation monitoring and control system,
- f. the location of the off-site monitoring site with respect to operator travel time to the treatment facility.
- g. the adequacy of the written response plan at the off-site location when alarms or out-of-range parameters are reported by facility instrumentation,
- h. the capabilities of a system or facility to be remotely shut down during an alarm condition, and
- i. the arrangement of piping and storage facilities so that there will be at least 12 hours for the correction of a process malfunction before the distribution system is impacted by the malfunction, and
- j. the ability of improperly treated water to be voided from the water distribution system prior to the first customer without an interruption of water service.

2. The treatment facility or distribution system shall include, but not limited to, instrumentation to continuously measure the following variables:

- a. water storage tank levels at the treatment facility and on the distribution system,
- b. pH, conductivity, turbidity, chlorine residual, and selective ions,

22.11B: continued

- c. effluent turbidity levels.
- d. effluent chlorine residuals, and
- e. chemical storage tanks and disinfection equipment.
- 3. The treatment facility or distribution system shall include, but not limited to, alarms systems for the following:
 - a. water storage tank high and low levels at the treatment facility and on the distribution system.
 - b. pH, conductivity, turbidity, chlorine residual, disinfectant equipment, and selective ions within specific ranges,
 - c. chlorine leaks and tank pressure changes.
 - d. distribution system pressure loss, within specific ranges,
 - e. fire and intrusion,
 - f. power failures.
 - g. critical pumps, motors and generators failures, and
 - h. chemical tank shortage volumes (high and low levels).
- (e) 4T Facilities: A treatment facility classified as a 4T and meeting the requirements of 310 CMR 22.11B(5)(d) shall be staffed as follows, with the exception of satellite or seasonal plants as described in 310 CMR 22.11B(7):
 - 1. Treatment facilities operating 16 to 24 hours per day will be required to be staffed at a minimum of 16 hours per day during the days when the treatment facility and or filtration units are in operation. The Primary Operator shall staff one work week shift.
 - 2. Treatment facilities operating less than 16 hours per day will be required to be staffed at a minimum of eight hours per day during the days when the treatment facility and/or filtration units are in operation. The Primary Operator shall staff one work week shift.
- (f) 3T Facilities: A treatment facility classified as a 3T and meeting the requirements of 310 CMR 22.11B(5)(d), with the exception of satellite or seasonal facility as described in 310 CMR 22.11B(7), shall be staffed at a minimum of eight hours per day during the days when the treatment facility and/or filtration units are in operation. The Primary Operator shall staff one work week shift.
- (g) 2T Facility or Less: A treatment facility classified as a 2T or less and meeting the requirements of 310 CMR 22.11B(5)(d), with the exception of satellite or seasonal facilities as described in 310 CMR 22.11B(7) shall be staffed at minimum of four hours per day during the days when the treatment facility is in operation. The Primary Operator shall staff one work week shift.
- (h) Slow Sand Filtration - Chemicals: A slow sand filtration process utilizing chemicals and meeting the requirements of 310 CMR 22.11B(5)(d) shall be staffed at a minimum of two hours per day during the days when the filtration process is in operation by the primary operator for one work week shift.
- (i) Very Small Systems and Non Community Public Water Systems. A Secondary Operator is not required for public water systems classified as a very small system (VSS), non-community or non-transient non-community water systems. However, during the times when the Primary Operator is temporarily absent (i.e. absences not exceeding 30 days), a person who has a certification which corresponds to the class of the facility or higher shall be retained during the absence of the Primary Operator to respond in the event of an emergency. In no event shall an emergency response time greater than one hour be deemed reasonable.
- (j) Slow Sand Filtration Non-Chemical: Slow sand filtration not utilizing chemicals may reduce the staffing requirements at 310 CMR 22.11B(1) and (2) by submitting to the Division a staffing and comprehensive operations plan for review and approval.
- (k) River or Streams: No exemptions or waivers from 310 CMR 22.11B shall be granted for filtration facilities, other than slow sand filtration, which treat water drawn directly from rivers or streams. These facilities must be staffed at all time during the days when the filtration units are in operation.
- (6) Contract Services With the prior written approval of the Department, public water systems may contract for the services of a certified operator to meet the requirements of 310 CMR 22.11B (1) and (2) provided that the public water system submit for the Department's approval a staffing and comprehensive operations plan in accordance with 310 CMR 22.11B(5)(b).

22.11B: continued

(7) Satellite or Seasonal Facility: Public water systems which have a staffed water treatment plant meeting the requirements of 310 CMR 22.11B and have one or more satellite or seasonal treatment facilities may with Departmental approval operate said facilities with remote control of key functions sufficiently to permit normally unstaffed operation of the satellite facility provided that said facilities comply with 310 CMR 22.11B(5)(d) and meets the requirements of the conditions listed at 310 CMR 22.11B(5)(a)1. through 5. and (5)(b). Facility maintenance, chemical deliveries and other actions requiring the physical presence of certified operators must be provided on the basis of the visits to the plant from the principal continuously staffed facility. Each satellite facility must be visited by a certified operator at least once per day to visual check and verify the instrumentation readings between the satellite or reasonable facility and local instrumentation and off-site instrumentation.

(8) Facility Verification: Before and after unstaffed operation periods, certified operators must check and confirm the validity and accuracy of data transmitted between the treatment facility and off-site location and make entry in the facility log of any malfunctions. Malfunctions must be corrected prior to further unstaffed operation of the treatment facility or distribution system.

22.12: Consecutive Public Water Systems

When a public water system supplies water to one or more other public water systems, the Department may, notwithstanding a provision of 310 CMR 22.05 to 310 CMR 22.09, inclusive, to the contrary, modify the monitoring requirements imposed by 310 CMR 22.12 to the extent that the interconnection of the system justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a written schedule approved by the Department.

22.13: Variances

The Department may grant variances from the requirements of 310 CMR 22.05 to 310 CMR 22.09, inclusive, but only subject to the following conditions:

- (1) The Department may grant one or more variances to one or more public water systems
 - (a) which, because of characteristics of the raw water sources which are reasonably available to the system(s), cannot comply with a prescribed maximum contaminant level or levels despite application of the best technology, treatment techniques, or other means, which the Department finds are generally available, taking costs into consideration. The Department shall not grant a variance pursuant to 310 CMR 22.13(1)(a) unless the Department finds in consultation with the Massachusetts Department of Public Health that the variance will not result in an unreasonable risk to health. If the Department grants a public water system a variance pursuant to 310 CMR 22.13(1)(a) the Department shall prescribe within one year of the date the variance is granted, a schedule for:
 1. Compliance, including increments of progress by the public water system with each maximum contaminant level requirement with respect to which the variance was granted. and
 2. Implementation by the public water system of such control measures as the Department may require for each contaminant, subject to the maximum contaminant level requirement, during the period ending on the date compliance with such requirement is required.
 - (b) from any provision of 310 CMR 22.13 which requires the use of a specified treatment technique with respect to a contaminant if the public water system applying for the variance demonstrates to the satisfaction of the Department that such treatment technique is not necessary to protect the health of persons because of the nature of the raw water source of such system. A variance granted pursuant to 310 CMR 22.13(1)(b) shall be conditioned on such monitoring and other requirements as the Department may prescribe.

22.13: continued

(2) Before the Department grants any variance, or prescribes any schedule pursuant to any variance, the Department shall give notice and opportunity for public hearing to the public, to the Massachusetts Department of Public Health, and to the Agency. A notice given pursuant to 310 CMR 22.13(2) may cover the granting of more than one variance or the prescribing of more than one schedule, and a hearing held pursuant to such notice shall include each of the variances and schedules covered by the notice.

(3) The Department shall not accept any application for a variance unless the public water system applying for the variance agrees in writing to all of the following:

- (a) Pay in full the cost of all notices and hearings required by 310 CMR 22.13(2).
- (b) Comply with any schedule prescribed pursuant to 310 CMR 22.13(1)(a) as expeditiously as possible;
- (c) Comply with any monitoring or other requirement prescribed pursuant to 310 CMR 22.13(1)(b).
- (d) Report to the Department, in the manner prescribed in 310 CMR 22.15, the results of all tests, measurements and analyses made in compliance with the variance, and with the schedule and or monitoring requirements prescribed pursuant to the variance;
- (e) Report to the Department, in the manner prescribed in 310 CMR 22.15, any failure to comply with the terms of the variance, or with the schedule and/or monitoring requirements prescribed pursuant to the variance;
- (f) Notify the public, in the manner prescribed in 310 CMR 22.16 of the granting of the variance;
- (g) Notify the public, in the manner prescribed in 310 CMR 22.16 of any failure to comply with the variance or with any requirement of any schedule or monitoring requirement prescribed pursuant to the variance; and
- (h) Maintain all the records prescribed in 310 CMR 22.17 in the manner prescribed in said 310 CMR 22.17.

(4) Every variance issued by the Department shall be conditioned on compliance by the public water system with the requirements set forth in 310 CMR 22.13(3). Said requirements shall have the same force and effect they would have if specifically set forth in 310 CMR 22.00.

(5) The Department shall promptly report to the Administrator or to the Administrator's designee, every variance granted by the Department. Such notification shall contain all of the following:

- (a) The reason for the variance;
- (b) The basis for the Department's finding that the granting of the variance will not result in an unreasonable risk to health, in those cases where the Department must make such a finding before granting a variance; and
- (c) Documentation of the need for the variance.

(6) All applications for variances shall be made on forms prescribed by the Department.

(7) Best Available Technologies for Organic Compounds:

- (a) The following technologies listed in 310 CMR 22.13(7)(a)1. through (a)54. are identified by the EPA Administrator, pursuant to section 1415(a) (1)(A) of the federal Safe Drinking Water Act as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for organic chemicals as listed in 310 CMR 22.07A(1) and 22.07B(1).

22.13: continued

Best Available Technologies

<u>Contaminant</u>	<u>PTA</u> ¹	<u>GAC</u> ²	<u>OX</u> ³
1. Benzene	X	X	
2. Carbon tetrachloride	X	X	
3. 1,2-Dichloroethane	X	X	
4. Trichloroethylene	X	X	
5. para-Dichlorobenzene	X	X	
6. 1,1-Dichloroethylene	X	X	
7. 1,1,1-Trichloroethane	X	X	
8. Vinyl chloride	X		
9. cis-1,2-Dichloroethylene	X	X	
10. 1,2-Dichloropropane	X	X	
11. Ethylbenzene	X	X	
12. Monochlorobenzene	X	X	
13. o-Dichlorobenzene	X	X	
14. Styrene	X	X	
15. Tetrachloroethylene	X	X	
16. Toluene	X	X	
17. trans-1,2-Dichloroethylene	X	X	
18. Xylenes (total)	X	X	
19. Alachlor		X	
20. Aldicarb		X	
21. Aldicarb sulfoxide		X	
22. Aldicarb sulfone		X	
23. Atrazine		X	
24. Carbofuran		X	
25. Chlordane		X	
26. Dibromochloropropane	X	X	
27. 2,4-D		X	
28. Ethylene dibromide	X	X	
29. Heptachlor		X	
30. Heptachlor epoxide		X	
31. Lindane		X	
32. Methoxychlor		X	
33. PCBs		X	
34. Pentachlorophenol		X	
35. Toxaphene		X	
36. 2,4,5-TP		X	
37. Endrin		X	
38. Benzo(a)pyrene		X	
39. Dalapone		X	
40. Dichloromethane		X	
41. Di(2-ethylhex)adipate	X	X	
42. Di(2-ethylhexyl)phthalate		X	
43. Dinoseb		X	
44. Diquat		X	
45. Endothall		X	
46. Glphosate			X
47. Hexachlorobenzene		X	
48. Hexachlorocyclopentadiene	X	X	
49. Oxamyl		X	
50. Picloram		X	
51. Simazine		X	
52. 1,2,4-Trichlorobenzene	X	X	
53. 1,1,2-Trichloroethane	X	X	
54. 2,3,7,8-TCDD(Dioxin)		X	

22.13: continued

(b) BATs for Inorganic Compounds: The EPA Administrator, pursuant to section 1415(a)(1)(A) of the federal Safe Drinking Water Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for the inorganic contaminants listed in 310 CMR 22.13(7)(b):

BAT FOR INORGANIC CONTAMINANTS LISTED IN 310 CMR 22.06(2)

CHEMICAL NAMEBAT(s)

Antimony	2,7
Asbestos	2,3,8
Barium	5,6,7,9
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6 ² ,7

CHEMICAL NAMEBAT(s)

Cyanide	5,7,10
Mercury	2 ¹ ,4,6 ¹ ,7 ¹
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2 ³ ,6,7,9
Thallium	1,5

Key to BATs in Table

- 1 = Activated Alumina
- 2 = Coagulation/Filtration (Not BAT for Systems <500 service connections)
- 3 = Direct and Diatomite Filtration
- 4 = Granular Activated Carbon
- 5 = Ion Exchange/Electrodialysis
- 6 = Lime Softening (not BAT for systems <500 service connections)
- 7 = Reverse Osmosis
- 8 = Corrosion Control
- 9 = Electrodialysis
- 10 = Chlorine
- 11 = Ultraviolet

¹BAT only if influent Hg concentrations $\leq 10 \mu\text{g/l}$.

²BAT for Chromium III only

³BAT for Selenium IV only

(c) Requirement to Install BAT: The Department shall require community water systems and non-transient, non-community water systems to install and/or use any treatment method identified in 310 CMR 22.13(7)(a) and (b) as a condition for granting a variance except as provided in 310 CMR 22.13(7)(d). If, after the system's installation of the treatment method, the system cannot meet the MCL, that system shall be eligible for a variance under the provisions of 310 CMR 22.13.

(d) Engineering Assessment Option: If a system can demonstrate through comprehensive engineering assessments, which may include pilot plant studies, that the treatment methods identified in 310 CMR 22.13(7)(a) and (b) would only achieve a *de minimis* reduction in contaminants, the Department may issue a schedule of compliance that requires the system being granted the variance to examine other treatment methods as a condition of obtaining the variance.

(e) Compliance Schedule: If the Department determines that a treatment method identified in 310 CMR 22.13(7)(d) is technically feasible, the Department may require the system to install and/or use that treatment method in connection with a compliance schedule issued under the provisions of section 1415(a)(1)(A) of the Safe Drinking Water Act. The Department's determination shall be based upon studies by the system and other relevant information.

22.13: continued

(8) No variances from the requirements set forth in 310 CMR 22.20A are allowed.

(9) No variances from the maximum contaminant level for total coliforms in 310 CMR 22.05(8) are allowed except as specified at 310 CMR 22.05(10) and in accordance with the variance requirements and procedures set forth in 310 CMR 22.13.

22.14: Exemptions

The Department may exempt any public water system from any maximum contaminant level prescribed in 310 CMR 22.06 to 310 CMR 22.09, inclusive, or from any prescribed treatment technique, or from both, but only subject to the following conditions:

- (1) The Department shall not grant any exemption unless the Department finds all of the following:
 - (a) Due to compelling factors, which may include economic factors, the public water system is unable to comply with the maximum contaminant level requirement or the treatment technique requirement;
 - (b) The public water system was in operation on the effective date of such maximum contaminant level requirement or treatment technique requirement; and
 - (c) The granting of the exemption will not result in an unreasonable risk to health. The Department shall make this finding in consultation with the Massachusetts Department of Public Health.
- (2) If the Department grants a public water system an exemption, the Department shall prescribe within one year of the date the exemption is granted, a schedule for
 - (a) Compliance, including increments of progress, by the public water system with each maximum contaminant level requirement and treatment technique requirement with respect to which the exemption was granted, and
 - (b) Implementation by the public water system of such control measures as the Department may require for each contaminant, subject to the maximum contaminant level requirement or treatment technique requirement, during the period ending on the date compliance with such requirement is required.
- (3) Before the Department grants any exemption, or prescribes any schedule pursuant to any exemption, the Department shall give notice and opportunity for public hearing to the public, to the Massachusetts Department of Public Health, and to the Agency. A notice given pursuant to 310 CMR 22.14(3) may cover the granting of more than one exemption or the prescribing of more than one schedule, and a hearing held pursuant to such notice shall include each of the exemptions and schedules covered by the notice.
- (4) The Department shall not accept any application for an exemption unless the public water system applying for the exemption agrees in writing to all of the following:
 - (a) Pay in full the cost of all notices and hearings required by 310 CMR 22.14(3);
 - (b) Comply with any schedule prescribed pursuant to 310 CMR 22.14(2) as expeditiously as possible, and in no event by later than the deadlines prescribed in 310 CMR 22.14(5);
 - (c) Report to the department, in the manner prescribed in 310 CMR 22.15, the results of all tests, measurements, and analyses made in compliance with the exemption, and with the schedule prescribed pursuant to the exemption;
 - (d) Report to the Department, in the manner prescribed in 310 CMR 22.15, any failure to comply with the terms of the exemption, or with the schedule prescribed pursuant to the exemption;
 - (e) Notify the public, in the manner prescribed in 310 CMR 22.16 of the granting of the exemption;
 - (f) Notify the public, in the manner prescribed in 310 CMR 22.16, of any failure to comply with the exemption or with any requirement of any schedule prescribed pursuant to the exemption;
 - (g) Maintain all the records prescribed in 310 CMR 22.17 in the manner prescribed in 310 CMR 22.17.

22.14: continued

(5) Every exemption shall be conditioned on compliance by the public water system with the following requirements, all of which shall have the same force and effect they would have if specifically set forth in 310 CMR 22.00:

(a) All of the requirements set forth in 310 CMR 22.14(4).

(b) Except as provided in 310 CMR 22.14(5)(c), every schedule prescribed pursuant to an exemption shall require compliance by the public water system with each maximum contaminant level and treatment technique requirement with respect to which the exemption was granted as expeditiously as practicable and in no event later than

1. January 1, 1981 in the case of an exemption granted with respect to a maximum contaminant level requirement or treatment technique requirement in effect on June 24, 1977; or

2. Not later than seven years after the effective date of the maximum contaminant level requirement or treatment technique requirement with respect to which the exemption was granted if such requirement took effect after June 24, 1977.

(c) If the exemption was granted to a public water system which, as determined by the Department, has entered into an enforceable agreement to become a part of a regional water system, the schedule prescribed pursuant to the exemption shall require compliance by said public water system with each contaminant level and treatment technique requirement with respect to which the exemption was granted as expeditiously as practicable and in no event later than

1. January 1, 1983 in the case of an exemption granted with respect to a maximum contaminant level requirement or treatment technique requirement in effect on June 24, 1977; or

2. Not later than nine years after the effective date of the maximum contaminant level requirement or treatment technique requirement with respect to which the exemption was granted if such requirement took effect after June 24, 1977.

(6) The Department shall promptly report to the Administrator or to the Administrator's designee every exemption granted by the Department. Such notification shall contain all of the following:

(a) The reason for the exemption;

(b) The basis for the Department's finding that the granting of the exemption will not result in an unreasonable risk to health; and

(c) Documentation of the need for the exemption.

(7) All applications for exemptions shall be made on forms prescribed by the Department.

(8) Exemptions from the requirements set forth at 310 CMR 22.06 and 22.07 will be granted only in accordance with Section 1416 of the federal Safe Drinking Water Act and 40 CFR 142.62.

(9) No exemptions from the requirements set forth in 310 CMR 22.20A(3)(a)3. and 310 CMR 22.20A(3)(b)2. to provide disinfection are allowed.

(10) No exemptions from the maximum contaminant level for total coliforms in 310 CMR 22.05(8) are allowed.

22.15: General Reporting Requirements

(1) Except where a different reporting period is specified in 310 CMR 22.00, each supplier of water shall report to the Department within 48 hours every failure to comply with any of 310 CMR 22.15 applicable to the supplier of water, including failure to comply with any monitoring requirement applicable to the supplier of water pursuant to any of 310 CMR 22.00.

NITRATE REPORTING REQUIREMENTS: With regard to nitrate, a supplier of water shall notify the Department of Public Health and local public health authorities within 30 days of the date the public water system first learns of an analysis taken for purposes of 310 CMR 22.06 which indicates nitrate levels in excess of 10 mg/L.

22.13: continued

(8) No variances from the requirements set forth in 310 CMR 22.20A are allowed.

(9) No variances from the maximum contaminant level for total coliforms in 310 CMR 22.05(8) are allowed except as specified at 310 CMR 22.05(10) and in accordance with the variance requirements and procedures set forth in 310 CMR 22.13.

22.14: Exemptions

The Department may exempt any public water system from any maximum contaminant level prescribed in 310 CMR 22.06 to 310 CMR 22.09, inclusive, or from any prescribed treatment technique, or from both, but only subject to the following conditions:

- (1) The Department shall not grant any exemption unless the Department finds all of the following:
 - (a) Due to compelling factors, which may include economic factors, the public water system is unable to comply with the maximum contaminant level requirement or the treatment technique requirement;
 - (b) The public water system was in operation on the effective date of such maximum contaminant level requirement or treatment technique requirement; and
 - (c) The granting of the exemption will not result in an unreasonable risk to health. The Department shall make this finding in consultation with the Massachusetts Department of Public Health.
- (2) If the Department grants a public water system an exemption, the Department shall prescribe within one year of the date the exemption is granted, a schedule for
 - (a) Compliance, including increments of progress, by the public water system with each maximum contaminant level requirement and treatment technique requirement with respect to which the exemption was granted, and
 - (b) Implementation by the public water system of such control measures as the Department may require for each contaminant, subject to the maximum contaminant level requirement or treatment technique requirement, during the period ending on the date compliance with such requirement is required.
- (3) Before the Department grants any exemption, or prescribes any schedule pursuant to any exemption, the Department shall give notice and opportunity for public hearing to the public, to the Massachusetts Department of Public Health, and to the Agency. A notice given pursuant to 310 CMR 22.14(3) may cover the granting of more than one exemption or the prescribing of more than one schedule, and a hearing held pursuant to such notice shall include each of the exemptions and schedules covered by the notice.
- (4) The Department shall not accept any application for an exemption unless the public water system applying for the exemption agrees in writing to all of the following:
 - (a) Pay in full the cost of all notices and hearings required by 310 CMR 22.14(3);
 - (b) Comply with any schedule prescribed pursuant to 310 CMR 22.14(2) as expeditiously as possible, and in no event by later than the deadlines prescribed in 310 CMR 22.14(5);
 - (c) Report to the department, in the manner prescribed in 310 CMR 22.15, the results of all tests, measurements, and analyses made in compliance with the exemption, and with the schedule prescribed pursuant to the exemption;
 - (d) Report to the Department, in the manner prescribed in 310 CMR 22.15, any failure to comply with the terms of the exemption, or with the schedule prescribed pursuant to the exemption;
 - (e) Notify the public, in the manner prescribed in 310 CMR 22.16 of the granting of the exemption;
 - (f) Notify the public, in the manner prescribed in 310 CMR 22.16, of any failure to comply with the exemption or with any requirement of any schedule prescribed pursuant to the exemption;
 - (g) Maintain all the records prescribed in 310 CMR 22.17 in the manner prescribed in 310 CMR 22.17.

22.14: continued

(5) Every exemption shall be conditioned on compliance by the public water system with the following requirements, all of which shall have the same force and effect they would have if specifically set forth in 310 CMR 22.00:

(a) All of the requirements set forth in 310 CMR 22.14(4).

(b) Except as provided in 310 CMR 22.14(5)(c), every schedule prescribed pursuant to an exemption shall require compliance by the public water system with each maximum contaminant level and treatment technique requirement with respect to which the exemption was granted as expeditiously as practicable and in no event later than

1. January 1, 1981 in the case of an exemption granted with respect to a maximum contaminant level requirement or treatment technique requirement in effect on June 24, 1977; or

2. Not later than seven years after the effective date of the maximum contaminant level requirement or treatment technique requirement with respect to which the exemption was granted if such requirement took effect after June 24, 1977.

(c) If the exemption was granted to a public water system which, as determined by the Department, has entered into an enforceable agreement to become a part of a regional water system, the schedule prescribed pursuant to the exemption shall require compliance by said public water system with each contaminant level and treatment technique requirement with respect to which the exemption was granted as expeditiously as practicable and in no event later than

1. January 1, 1983 in the case of an exemption granted with respect to a maximum contaminant level requirement or treatment technique requirement in effect on June 24, 1977; or

2. Not later than nine years after the effective date of the maximum contaminant level requirement or treatment technique requirement with respect to which the exemption was granted if such requirement took effect after June 24, 1977.

(6) The Department shall promptly report to the Administrator or to the Administrator's designee every exemption granted by the Department. Such notification shall contain all of the following:

(a) The reason for the exemption;

(b) The basis for the Department's finding that the granting of the exemption will not result in an unreasonable risk to health; and

(c) Documentation of the need for the exemption.

(7) All applications for exemptions shall be made on forms prescribed by the Department

(8) Exemptions from the requirements set forth at 310 CMR 22.06 and 22.07 will be granted only in accordance with Section 1416 of the federal Safe Drinking Water Act and 40 CFR 142.62.

(9) No exemptions from the requirements set forth in 310 CMR 22.20A(3)(a)3. and 310 CMR 22.20A(3)(b)2. to provide disinfection are allowed.

(10) No exemptions from the maximum contaminant level for total coliforms in 310 CMR 22.05(8) are allowed.

22.15: General Reporting Requirements

(1) Except where a different reporting period is specified in 310 CMR 22.00, each supplier of water shall report to the Department within 48 hours every failure to comply with any of 310 CMR 22.15 applicable to the supplier of water, including failure to comply with any monitoring requirement applicable to the supplier of water pursuant to any of 310 CMR 22.00.

NITRATE REPORTING REQUIREMENTS: With regard to nitrate, a supplier of water shall notify the Department of Public Health and local public health authorities within 30 days of the date the public water system first learns of an analysis taken for purposes of 310 CMR 22.06 which indicates nitrate levels in excess of 10 mg/L.

22.15: continued

(2) Unless a shorter reporting period is prescribed in 310 CMR 22.15(1) or in any other provision of 310 CMR 22.00, the supplier of water shall report to the Department the results of every test, measurement or analysis the supplier of water is required by 310 CMR 22.15 to make within (a) the first ten days following the month in which the results are received or (b) the first ten days following the end of the required monitoring period as stipulated by the Department, whichever of these is shorter.

(3) The supplier of water is not required to report analytical results to the Department in cases where a Department laboratory performs the analysis.

(4) Chemical Addition: Every supplier of water shall report to the Department at least once each month the use of chemicals added to the water supply. Such reports shall include, but not be limited to, the name of the chemical, the amount added, the resulting concentration of the chemical in the water, and the reason for adding the chemical to the water.

(5) Annual Statistical Report: Every supplier of water shall report to the Department in January of each year on a form prescribed by the Department the amount of water that passes through their distribution systems during the preceding calendar year. Such reports shall include, at a minimum, the following:

- (a) a monthly breakdown of the amount of water
 - 1. purchased from other public water systems,
 - 2. sold to other public water systems, and
 - 3. sold or otherwise supplied to other consumers.
- (b) an annual breakdown, to the extent known to the supplier of water, of the amount of water furnished during the year to each of the following classes of users:
 - 1. residential users.
 - 2. agricultural users.
 - 3. commercial users.
 - 4. industrial users.
 - 5. other public water systems.
 - 6. unaccounted for.
- (c) Total number of users served by the system.
- (d) Total number of days the system is operating during the calendar year.
- (e) An annually updated emergency response plan.
- (f) Names and Grades of Certified Operators.

(6) Reporting and Public Notification for Certain Unregulated Contaminants. A Community water system or non-transient, non-community water system required to monitor under 310 CMR 22.07C shall send DEP any public notice required under 310 CMR 22.16(1)(d) and two copies of such monitoring within 30 days of receipt of the analysis report unless 310 CMR 22.15(2) requires submission by an earlier date.

(7) All public water systems shall furnish the information requested by DEP, in a format specified by DEP, for each sample analyzed under 310 CMR 22.07B and 310 CMR 22.07C including:

- (a) Results of all analytical methods, including negatives;
- (b) Name and address of the system that supplied the sample;
- (c) Contaminant(s);
- (d) Analytical method(s) used;
- (e) Date of sample;
- (f) Date of analysis;
- (g) Laboratory name and certification number.

(8) Notification of Imposition of Mandatory Water Use Restrictions and Local Drinking Water Health Advisory

- (a) All public water systems establishing a mandatory restriction on water use must notify the Department in writing within 14 days of its effective date. In its notice to the Department, the public water system establishing a mandatory restriction on water use shall include appropriate regulations, bylaws or ordinances establishing and imposing the restriction.

22.15: continued

- (b) Public water systems establishing water use restrictions should consider requesting from the Department a declaration of a state of water supply emergency pursuant to M.G.L. c. 21G.
- (c) Public water systems establishing a local drinking water health advisory shall notify the Department within 48 hours of its imposition.

22.16: Public Notification Requirements

- (1) (a) Maximum Contaminant Level (MCL), Treatment Technique, and Variance and Exemption Schedule Violations. A supplier of water who fails to comply with an applicable MCL or treatment technique established by 310 CMR 22.00, or who fails to comply with the requirements of any schedule prescribed pursuant to a variance or exemption, shall notify persons served by the system as follows:
 - 1. Except as provided in 310 CMR 22.16(1)(c), the supplier of water must give notice:
 - a. By publication in a daily newspaper of general circulation serving the area served by the public water system as soon as possible, but no later than 14 days after the supplier of water first learns of the analytic results which indicate an exceedance, violation or failure. If the area served by a public water system is not served by a daily newspaper of general circulation, notice shall be given by publication in a weekly newspaper of general circulation serving the area.
 - b. By mail delivery (by direct mail or with the water bill), or by hand delivery, not later than 30 days after the supplier of water first learns of the analytic results which indicate an exceedance, violation or failure. The Department may waive mail or hand delivery if it determines that the supplier of water has corrected the violation or failure within the 30-day period. The Department must make the waiver in writing and within the 30-day period.
 - c. For violations of the MCLs of contaminants that may pose an acute risk to human health, by furnishing a copy of the notice to the radio and television stations serving the area served by the public water system as soon as possible, but no later than 72 hours after the supplier of water first learns of the analytic results which indicate an exceedance, violation or failure. The following violations are acute violations:
 - (i) Any violation specified by the Department as posing an acute risk to human health;
 - (ii) Violation of the MCL for nitrate or nitrite as defined in 310 CMR 22.06 and determined according to 310 CMR 22.06(12)(c); and
 - (iii) Occurrence of a waterborne disease outbreak, as defined in 310 CMR 22.02 in an unfiltered system subject to the requirements of 310 CMR 22.20A, after June 30, 1991.
 - (iv) Violation of the MCL for total coliforms, when fecal coliform or E. coli are present in the water distribution system, as specified in 310 CMR 22.05(8)(b).
 - 2. Except as provided in 310 CMR 22.16(1)(a)3., following the initial notice given under 310 CMR 22.16(1)(a)1., the supplier of water must give notice at least once every three months by mail delivery (by direct mail or with the water bill) or by hand delivery, for as long as the violation or failure exists.
 - 3. a. In lieu of the requirements of 310 CMR 22.16(1)(a)1.a. and 310 CMR 22.16(1)(a)2., a supplier of water for a community water system in an area that is not served by a daily or weekly newspaper of general circulation must give notice by hand delivery or by continuous posting in conspicuous places within the area served by the system. Notice by hand delivery or posting must begin as soon as possible, but no later than 72 hours after the supplier of water first learns of the analytic results which indicate an exceedance, violation or failure for acute violations (as defined in 310 CMR 22.16(1)(a)1.c.) or 14 days after the supplier of water first learns of the analytic results which indicate an exceedance, violation or failure for any other violation. Posting must continue for as long as the violation or failure exists. Notice by hand delivery must be repeated at least every three months for as long as the violation or failure exists.

22.16: continued

b. In lieu of the requirements of 310 CMR 22.16(1)(a)1. and 310 CMR 22.16(1)(a)2., a supplier of water for a non-community water system may give notice by hand delivery or by continuous posting in conspicuous places within the area served by the system. Notice by hand delivery or posting must begin as soon as possible but no later than 72 hours after the supplier of water first learns of the analytic results which indicate an exceedance, violation or failure for acute violations (as defined in 310 CMR 22.16(1)(a)) or 14 days after the supplier of water first learns of the analytic results which indicate an exceedance, violation or failure for any other violation. Posting must continue for as long as the violation or failure exists. Notice by hand delivery must be repeated at least every three months for as long as the violation or failure exists.

(b) Other Violations, Variances, Exemptions. A supplier of water who fails to perform monitoring required by 310 CMR 22.00, fails to comply with a testing procedure established by 310 CMR 22.00, is subject to a variance granted under 310 CMR 22.13 or is subject to an exemption under 310 CMR 22.14, shall notify persons served by the system as follows:

1. Except as provided in 310 CMR 22.16(1)(b)3. and 310 CMR 22.16(1)(b)4., the supplier of water must give notice within three months of the violation or granting of a variance or exemption by publication in a daily newspaper of general circulation serving the area served by the system. If the area served by a public water system is not served by a daily newspaper of general circulation, notice shall be given by publication in a weekly newspaper of general circulation serving the area.

2. Except as provided in 310 CMR 22.16(1)(b)3. and 310 CMR 22.16(1)(b)4. following the initial notice given under 310 CMR 22.16(1)(b)1., the supplier of water must give notice at least once every three months by mail delivery (by direct mail or with the water bill) or by hand delivery, for as long as the violation exists. Repeat notice of the existence of a variance or exemption must be given every three months for as long as the variance or exemption remains in effect.

3. In lieu of the requirements of 310 CMR 22.16(1)(b)1. and 310 CMR 22.16(1)(b)2., a supplier of water in an area that is not served by a daily or weekly newspaper of general circulation must give notice, within three months of the violation or granting of the variance or exemption, by hand delivery or by continuous posting in conspicuous places within the area served by the system. Posting must continue for as long as the violation exists or a variance or exemption remains in effect. Notice by hand delivery must be repeated at least every three months for as long as the violation exists or a variance or exemption remains in effect.

4. In lieu of the requirements of 310 CMR 22.16(1)(b)1. and 310 CMR 22.16(1)(b)2., the supplier of water for a non-community water system may give notice within three months of the violation or granting of the variance or exemption, by hand delivery or by continuous posting in conspicuous places within the area served by the system. Posting must continue for as long as the violation exists or a variance or exemption remains in effect. Notice by hand delivery must be repeated at least every three months for as long as the violation exists or a variance or exemption remains in effect.

5. Separable Distribution Systems: If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, public notice may be given to only the area served by that portion of the system which is out of compliance.

(c) Notice to New Billing Units. The supplier of water of a community water system must give a copy of any notice published within the last six month period for any violation of any maximum contaminant level, treatment technique requirement, or any variance or exemption schedule to all new billing units or new hookups, prior to or at the time service begins.

(d) General Content of Public Notice. Each notice required by 310 CMR 22.16(1)(a) must provide a clear and readily understandable explanation of:

1. the violation;
2. any potential adverse health effects;
3. the population at risk;
4. the steps that the public water system is taking to correct the violation;
5. the necessity for seeking alternative water supplies, if any, and;
6. any preventive measures the consumer should take until the violation is corrected.

22.16: continued

Each notice shall be conspicuous and shall not contain unduly technical language, unduly small print, or similar problems that frustrate the purpose of the notice.

Each notice shall include the telephone number of the owner, operator or designee of the public water system as a source of additional information concerning the notice.

Public water systems which serve water to substantial numbers of non-english speaking persons also shall give the required notice in the primary language or languages of these customers.

(e) Mandatory Health Effects Language. When providing the information on potential adverse health effects required by 310 CMR 22.16(1)(d) in notices of:

- violations of maximum contaminant levels or treatment technique requirements;
- the granting or the continued existence of exemptions or variances; and
- failure to comply with a variance or exemption schedule,

The supplier of water shall include the language specified below for each contaminant. (If the language for a particular contaminant is not specified below at the time notice is required, then 310 CMR 22.16(1)(e) does not apply.)

1. Trichloroethylene. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that trichloroethylene is a health concern at certain levels of exposure. This chemical is a common metal cleaning and dry cleaning fluid. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set forth the enforceable drinking water standard for trichloroethylene at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

2. Carbon Tetrachloride. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that carbon tetrachloride is a health concern at certain levels of exposure. This chemical was once a popular household cleaning fluid. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for carbon tetrachloride at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

3. 1,2-Dichloroethane. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,2-dichloroethane is a health concern at certain levels of exposure. This chemical is used as a cleaning fluid for fats, oils, waxes, and resins. It generally gets into drinking water from improper disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for 1,2-dichloroethane at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

22.16: continued

4. Vinyl Chloride. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that vinyl chloride is a health concern at certain levels of exposure. This chemical is used in industry and is found in drinking water as a result of the breakdown of related solvents. The solvents are used as cleaners and degreasers of metals and generally get into drinking water by improper waste disposal. This chemical has been associated with significantly increased risks of cancer among certain industrial workers who were exposed to relatively large amounts of this chemical during their working careers. This chemical has also been shown to cause cancer in laboratory animals when the animals are exposed at high levels over their lifetimes. Chemicals that cause increased risk of cancer among exposed industrial workers and in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for vinyl chloride at 0.002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in humans and laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

5. Benzene. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that benzene is a health concern at certain levels of exposure. This chemical is used as a solvent and degreaser of metals. It is also a major component of gasoline. Drinking water contamination generally results from leaking underground gasoline and petroleum tanks or improper waste disposal. This chemical has been associated with significantly increased risks of leukemia among certain industrial workers who were exposed to relatively large amounts of this chemical during their working careers. This chemical has also been shown to cause cancer in laboratory animals when the animals are exposed at high levels over their lifetimes. Chemicals that cause increased risk of cancer among exposed industrial workers and in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for benzene at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in humans and laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

6. 1,1-Dichloroethylene. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,1-dichloroethylene is a health concern at certain levels of exposure. This chemical is used in industry and is found in drinking water as a result of the breakdown of related solvents. The solvents are used as cleaners and degreasers of metals and generally get into drinking water by improper waste disposal. This chemical has been shown to cause liver and kidney damage in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals which cause adverse effects in laboratory animals also may cause adverse health effects in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for 1,1-dichloroethylene at 0.007 parts per million (ppm) to reduce the risk of these adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

7. Para-dichlorobenzene. The Massachusetts Department of Environmental Protection (DEP) sets drinking water standards and has determined that para-dichlorobenzene is a health concern at certain levels of exposure. This chemical is a component of deodorizers, moth balls, and pesticides. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause liver and kidney damage in laboratory animals such as rats and mice when the animals are exposed to high levels over their lifetimes. Chemicals which cause adverse effects in laboratory animals also may cause adverse health effects in humans who are exposed at lower levels over long periods of time. DEP set the enforceable drinking water standard for para-dichlorobenzene at 0.005 parts per million (ppm) to reduce the risk of these adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

22.16: continued

8. 1,1,1-Trichloroethane. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,1,1-trichloroethane is a health concern at certain levels of exposure. This chemical is used as a cleaner and degreaser of metals. It generally gets into drinking water by improper waste disposal. This chemical has been shown to damage the liver, nervous system, and circulatory system of laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during their working careers also suffered damage to the liver, nervous system, and circulatory system. Chemicals which cause adverse effects among exposed industrial workers and in laboratory animals also may cause adverse health effects in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for 1,1,1-trichloroethane at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects which have been observed in humans and laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

9. Public Notice for Naturally Fluoridated Systems. The United States Environmental Protection Agency requires that we send you this notice on the level of fluoride in your drinking water. The drinking water in your community has a fluoride concentration of milligrams per liter (mg/L).

Federal regulations require that fluoride, which occurs naturally in your water supply, not exceed a concentration of 4.0 mg/L in drinking water. This is an enforceable standard called a Maximum Contaminant Level (MCL), and it has been established to protect the public health. Exposure to drinking water levels above 4.0 mg/L for many years may result in some cases of crippling skeletal fluorosis, which is a serious bone disorder.

Federal law also requires that we notify you when monitoring indicates that the fluoride in your drinking water exceeds 2.0 mg/L.

This is intended to alert families about dental problems that might affect children under nine years of age. The fluoride concentration of your water exceeds this federal guideline.

Fluoride in children's drinking water at levels of approximately ¹ mg/L reduces the number of dental cavities. However, some children exposed to levels of fluoride greater than about 2.0 mg/L may develop dental fluorosis. Dental fluorosis, in its moderate and severe forms, is a brown staining and/or pitting of the *permanent* teeth.

Because dental fluorosis occurs only when *developing* teeth (before they erupt from the gums) are exposed to elevated fluoride levels, households without children are not expected to be affected by this level of fluoride. Families with children under the age of nine are encouraged to seek other sources of drinking water for their children to avoid the possibility of staining and pitting.

Your water supplier can lower the concentration of fluoride in your water so that you will still receive the benefits of cavity prevention while the possibility of stained and pitted teeth is minimized. Removal of fluoride may increase your water costs. Treatment systems are also commercially available for home use.

Information on such systems is available at the address given below. Low fluoride bottled drinking water that would meet all standards is also commercially available.

10. Microbiological contaminants (for use when there is a violation of the treatment technique requirements for filtration and disinfection in 310 CMR 22.20A). The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that the presence of microbiological contaminants are a health concern at certain levels of exposure. If water is inadequately treated, microbiological contaminants in that water may cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and any associated headaches and fatigue. These symptoms, however, are not just associated with disease causing organisms in drinking water, but also may be caused by a number of factors other than your drinking water. EPA has set enforceable requirements for treating drinking water to reduce the risk of

¹ The supplier of water shall insert the compliance result that triggered notification under 310 CMR 22.16.

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these adverse health effects. Treatment such as filtering and disinfecting the water removes or destroys microbiological contaminants. Drinking water which is treated to meet EPA requirements is associated with little to none of this risk and should be considered safe.

11. Total coliforms (To be used when there is a violation of 310 CMR 22.05(8)(a) and not a violation of 310 CMR 22.05(8)(b)). The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that the presence of total coliform is a possible health concern. Total coliforms are common in the environment and are generally not harmful themselves. The presence of these bacteria in drinking water, however, generally is a result of a problem with water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and any associated headaches and fatigue. These symptoms, however, are not just associated with disease-causing organisms in drinking water, but also may be caused by a number of factors other than your drinking water. EPA has set an enforceable drinking water standard for total coliforms to reduce the risk of these adverse health effects. Under this standard, no more than 5.0% of the samples collected during a month can contain these bacteria, except that systems collecting fewer than 40 samples/month that have one total coliform-positive sample per month are not violating the standard. Drinking water which meets this standard is usually not associated with a health risk from disease-causing bacteria and should be considered safe.

12. Fecal Coliform/*E. coli* (To be used when there is a violation of 310 CMR 22.05(8)(b) or both 310 CMR 22.05(8)(a) and 310 CMR 22.05(8)(b)). The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that the presence of fecal coliform or *E. coli* is a serious health concern. Fecal coliform and *E. coli* are generally not harmful themselves, but their presence in drinking water is serious because they usually are associated with sewage or animal wastes. The presence of these bacteria in drinking water is generally a result of a problem with water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and associated headaches and fatigue. These symptoms, however, are not just associated with disease-causing organisms in drinking water, but also may be caused by a number of factors other than your drinking water. EPA has set an enforceable drinking water standard for fecal coliform and *E. coli* to reduce the risk of these adverse health effects. Under this standard all drinking water samples must be free of these bacteria. Drinking water which meets this standard is associated with little or none of this risk and should be considered safe. The Department of Environmental Protection and local health authorities recommend that consumers take the following precautions: (To be inserted by the public water system, according to instructions from the Department or local authorities).

13. Lead. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that lead is a health concern at certain exposure levels. Materials that contain lead have frequently been used in the construction of water supply distribution systems, and plumbing systems in private homes and other buildings. The most commonly found materials include service lines, pipes, brass and bronze fixtures, and solders and fluxes. Lead in these materials can contaminate drinking water as a result of the corrosion that takes place when water comes into contact with those materials. Lead can cause a variety of adverse health effects in humans. At relatively low levels of exposure, these effects may include interference with red blood cell chemistry, delays in normal physical and mental development in babies and young children, slight deficits in the attention span, hearing, and learning abilities of children, and slight increases in the blood pressure of some adults. EPA's national primary drinking water regulation requires all public water systems to optimize corrosion control to minimize lead contamination resulting from the corrosion of plumbing materials. Public water systems serving 50,000 people or fewer that have lead concentrations below

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15 parts per billion (ppb) in more than 90% of tap water samples (the "action level") have optimized their corrosion control treatment. Any water system that exceeds the action level must also monitor their source water to determine whether treatment to remove lead in source water is needed.

Any water system that continues to exceed the action level after installation of corrosion control and/or source water treatment must eventually replace all lead service lines contributing in excess of 15 ppb of lead to drinking water. Any water system that exceeds the action level must also undertake a public education program to inform consumers of ways they can reduce their exposure to potentially high levels of lead in drinking water.

14. Copper. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that copper is a health concern at certain exposure levels. Copper, a reddish-brown metal, is often used to plumb residential and commercial structures that are connected to water distribution systems. Copper contaminating drinking water as a corrosion by-product occurs as the result of the corrosion of copper pipes that remain in contact with water for a prolonged period of time. Copper is an essential nutrient, but at high doses it has been shown to cause stomach and intestinal distress, liver and kidney damage, and anemia. Persons with Wilson's disease may be at a higher risk of adverse health effects due to copper than the general public.

EPA's national primary drinking water regulation requires all public water systems to install optimal corrosion control to minimize copper contamination resulting from the corrosion of plumbing materials. Public water systems serving 50,000 people or fewer that have copper concentrations below 1.3 parts per million (ppm) in more than 90% of tap water samples (the "action level") are not required to install or improve their treatment. Any water system that exceeds the action level must also monitor their source water to determine whether treatment to remove copper in source water is needed.

15. Asbestos: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that asbestos fibers greater than ten micrometers in length are a health concern at certain levels of exposure. Asbestos is a naturally occurring mineral. Most asbestos fibers in drinking water are less than ten micrometers in length and occur in drinking water from natural sources and from corroded asbestos-cement pipes in the distribution system. The major uses of asbestos were in the production of cements, floor tiles, paper products, paint, and caulking; in transportation-related applications; and in the production of textiles and plastics. Asbestos was once a popular insulating and fire retardant material. Inhalation studies have shown that various forms of asbestos have produced lung tumors in laboratory animals. The available information on the risk of developing gastrointestinal tract cancer associated with the ingestion of asbestos from drinking water is limited. Ingestion of intermediate-range chrysotile asbestos fibers greater than ten micrometers in length is associated with causing benign tumors in male rats. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for asbestos at 7,000,000 long fibers per liter to reduce the potential risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to asbestos.

16. Barium: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that barium is a health concern at certain levels of exposure. This inorganic chemical occurs naturally in some aquifers that serve as sources of ground water. It is also used in oil and gas drilling muds, automotive paints, bricks, tiles and jet fuels. It generally gets into drinking water after dissolving from naturally occurring minerals in the ground. This chemical may damage the heart and cardiovascular system, and is associated with high blood pressure in laboratory animals such as rats exposed to high levels during their lifetimes. In humans, EPA believes that effects from barium on blood pressure should not occur below two parts per million (ppm) in drinking water.

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EPA has set the drinking water standard for barium at two parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to barium.

17. Cadmium: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that cadmium is a health concern at certain levels of exposure. Food and the smoking of tobacco are common sources of general exposure. This inorganic metal is a contaminant in the metals used to galvanize pipe. It generally gets into water by corrosion of galvanized pipes or by improper waste disposal. This chemical has been shown to damage the kidney in animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the kidney. EPA has set the drinking water standard for cadmium at 0.005 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to cadmium.

18. Chromium: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that chromium is a health concern at certain levels of exposure. This inorganic metal occurs naturally in the ground and is often used in the electroplating of metals. It generally gets into water from runoff from old mining operations and improper waste disposal from plating operations. This chemical has been shown to damage the kidney, nervous system, and the circulatory system of laboratory animals such as rats and mice when the animals are exposed at high levels. Some humans who were exposed to high levels of this chemical suffered liver and kidney damage, dermatitis and respiratory problems. EPA has set the drinking water standard for chromium at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to chromium.

19. Mercury: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that mercury is a health concern at certain levels of exposure. This inorganic metal is used in electrical equipment and some water pumps. It usually gets into water as a result of improper waste disposal. This chemical has been shown to damage the kidney of laboratory animals such as rats when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for mercury at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to mercury.

20. Nitrate: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nitrate poses an acute health concern at certain levels of exposure. Nitrate is used in fertilizer and is found in sewage and wastes from human and/or farm animals and generally gets into drinking water from those activities. Excessive levels of nitrate in drinking water have caused serious illness and sometimes death in infants under six months of age. The serious illness in infants is caused because nitrate is converted to nitrite in the body. Nitrite interferes with the oxygen carrying capacity of the child's blood. This is an acute disease in that symptoms can develop rapidly in infants. In most cases, a health deteriorates over a period of days. Symptoms include shortness of breath and cyanosis of the skin. Clearly, expert medical advice should be sought immediately if these symptoms occur. The purpose of this notice is to encourage parents and other responsible parties to provide infants with an alternate source of drinking water. Local and State health authorities are the best source for information concerning alternate sources of drinking water for infants. EPA has set the drinking water standard at ten parts per million (ppm) for nitrate to protect against the risk of these adverse effects. EPA has also set a drinking water standard for nitrite at 1 ppm. To allow for the fact that the toxicity of nitrate and nitrite are additive, EPA has also established a standard for the sum of nitrate and nitrite at ten ppm. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to nitrate.

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21. Nitrite: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nitrite poses an acute health concern at certain levels of exposure. This inorganic chemical is used in fertilizers and is found in sewage and wastes from humans and/or farm animals and generally gets into drinking water as a result of those activities. While excessive levels of nitrite in drinking water have not been observed, other sources of nitrite have caused serious illness and sometimes death in infants under six months of age. The serious illness in infants is caused because nitrite interferes with the oxygen carrying capacity of the child's blood. This is an acute disease in that symptoms can develop rapidly. However, in most cases, health deteriorates over a period of days. Symptoms include shortness of breath and cyanosis of the skin. Clearly, expert medical advice should be sought immediately if these symptoms occur. The purpose of this notice is to encourage parents and other responsible parties to provide infants with an alternate source of drinking water. Local and State health authorities are the best source for information concerning alternate sources of drinking water for infants. EPA has set the drinking water standard at one part per million (ppm) for nitrite to protect against the risk of these adverse effects. EPA has also set a drinking water standard for nitrate (converted to nitrite in humans) at ten ppm and for the sum of nitrate and nitrite at ten ppm. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to nitrite.

22. Selenium: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that selenium is a health concern at certain high levels of exposure. Selenium is also an essential nutrient at low levels of exposure. This inorganic chemical is found naturally in food and soils and is used in electronics, photocopy operations, the manufacture of glass, chemicals, drugs, and as a fungicide and a feed additive. In humans, exposure to high levels of selenium over a long period of time has resulted in a number of adverse health effects, including a loss of feeling and control in the arms and legs. EPA has set the drinking water standard for selenium at 0.05 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to selenium.

23. Acrylamide: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that acrylamide is a health concern at certain levels of exposure. Polymers made from acrylamide are sometimes used to treat water supplies to remove particulate contaminants. Acrylamide has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. Sufficiently large doses of acrylamide are known to cause neurological injury. EPA has set the drinking water standard for acrylamide using a treatment technique to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. This treatment technique limits the amount of acrylamide in the polymer and the amount of the polymer which may be added to drinking water to remove particulates. Drinking water systems which comply with this treatment technique have little to no risk and are considered safe with respect to acrylamide.

24. Alachlor: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that alachlor is a health concern at certain levels of exposure. This organic chemical is a widely used pesticide. When soil and climatic conditions are favorable, alachlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for alachlor at 0.002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to alachlor.

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25. Aldicarb: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb at 0.003 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb.

26. Aldicarb sulfoxide: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb sulfoxide is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Aldicarb sulfoxide in ground water is primarily a breakdown product of aldicarb. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb sulfoxide may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb sulfoxide at 0.004 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb sulfoxide.

27. Aldicarb sulfone: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb sulfone is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Aldicarb sulfone is formed from the breakdown of aldicarb and is considered for registration as a pesticide under the name aldoxycarb. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb sulfone may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb sulfone at 0.002 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb sulfone.

28. Atrazine: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that atrazine is a health concern at certain levels of exposure. This organic chemical is a herbicide. When soil and climatic conditions are favorable, atrazine may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to affect offspring of rats and the heart of dogs. EPA has set the drinking water standard for atrazine at 0.003 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to atrazine.

29. Carbofuran: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that carbofuran is a health concern at certain levels of exposure. This organic chemical is a pesticide. When soil and climatic conditions are favorable, carbofuran may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the nervous and reproductive systems of laboratory animals such as rats and mice exposed at high levels over their lifetimes. Some humans who were exposed to relatively large amounts of this chemical during their working careers also suffered damage to the nervous system. Effects on the nervous system are generally rapidly reversible. EPA has set the drinking water standard for carbofuran at 0.04 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to carbofuran.

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30. Chlordane: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that chlordane is a health concern at certain levels of exposure. This organic chemical is a pesticide used to control termites. Chlordane is not very mobile in soils. It usually gets into drinking water after application near water supply intakes or wells. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for chlordane at 0.002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to chlordane.

31. Dibromochloropropane (DBCP): The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that DBCP is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, dibromochloropropane may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for DBCP at 0.0002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to DBCP.

32. o-Dichlorobenzene: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that o-dichlorobenzene is a health concern at certain levels of exposure. This organic chemical is used as a solvent in the production of pesticides and dyes. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and the blood cells of laboratory animals such as rats and mice exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the liver, nervous system, and circulatory system. EPA has set the drinking water standard for o-dichlorobenzene at 0.6 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to o-dichlorobenzene.

33. cis-1,2-Dichloroethylene: The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that cis-1,2-dichloroethylene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and intermediate in chemical production. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, nervous system, and circulatory system of laboratory animals such as rats and mice when exposed at high levels over their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for cis-1,2-dichloroethylene at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to cis-1,2-dichloroethylene.

34. trans-1,2-Dichloroethylene: The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that trans-1,2-dichloroethylene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and intermediate in chemical production. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, nervous system, and the circulatory system of laboratory animals such as rats and mice when exposed at high levels over their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system.

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EPA has set the drinking water standard for trans-1,2-dichloroethylene at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to trans-1,2-dichloroethylene.

35. 1,2-Dichloropropane: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,2-dichloropropane is a health concern at certain levels of exposure. This organic chemical is used as a solvent and pesticide. When soil and climatic conditions are favorable, 1,2-dichloropropane may get into drinking water by runoff into surface water or by leaching into ground water. It may also get into drinking water through improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for 1,2-dichloropropane at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 1,2-dichloropropane.

36. 2,4-D: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 2,4-D is a health concern at certain levels of exposure. This organic chemical is used as a herbicide and to control algae in reservoirs. When soil and climatic conditions are favorable, 2,4-D may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver and kidney of laboratory animals such as rats exposed at high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system.

EPA has set the drinking water standard for 2,4-D at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 2,4-D.

37. Epichlorohydrin: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that epichlorohydrin is a health concern at certain levels of exposure. Polymers made from epichlorohydrin are sometimes used in the treatment of water supplies as a flocculent to remove particulates. Epichlorohydrin generally gets into drinking water by improper use of these polymers. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for epichlorohydrin using a treatment technique to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. This treatment technique limits the amount of epichlorohydrin in the polymer and the amount of the polymer which may be added to drinking water as a flocculent to remove particulates. Drinking water systems which comply with this treatment technique have little to no risk and are considered safe with respect to epichlorohydrin.

38. Ethylbenzene: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined ethylbenzene is a health concern at certain levels of exposure. This organic chemical is a major component of gasoline. It generally gets into water by improper waste disposal or leaking gasoline tanks. This chemical has been shown to damage the kidney, liver, and nervous system of laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for ethylbenzene at 0.7 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to ethylbenzene.

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39. Ethylene dibromide (EDB): The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that EDB is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, EDB may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. DEP has set the drinking water standard for EDB at 0.00002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to EDB.

40. Heptachlor: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that heptachlor is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, heptachlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standards for heptachlor at 0.0004 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to heptachlor.

41. Heptachlor epoxide: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that heptachlor epoxide is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, heptachlor epoxide may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standards for heptachlor epoxide at 0.0002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to heptachlor epoxide.

42. Lindane: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that lindane is a health concern at certain levels of exposure. This organic chemical is used as a pesticide. When soil and climatic conditions are favorable, lindane may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver, kidney, nervous system, and immune system of laboratory animals such as rats, mice and dogs exposed at high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system and circulatory system. EPA has established the drinking water standard for lindane at 0.0002 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to lindane.

43. Methoxychlor: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that methoxychlor is a health concern at certain levels of exposure. This organic chemical is used as a pesticide. When soil and climatic conditions are favorable, methoxychlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver, kidney, nervous system, and reproductive system of laboratory animals such as rats exposed at high levels during their lifetimes. It has also been shown to produce growth retardation in rats. EPA has set the drinking water standard for methoxychlor at 0.04 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to methoxychlor.

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44. Monochlorobenzene: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that monochlorobenzene is a health concern at certain levels of exposure. This organic chemical is used as a solvent. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and nervous system of laboratory animals such as rats and mice exposed to high levels during their lifetimes. EPA has set the drinking water standard for monochlorobenzene at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to monochlorobenzene.

45. Polychlorinated biphenyls (PCBs): The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that polychlorinated biphenyls (PCBs) are a health concern at certain levels of exposure. These organic chemicals were once widely used in electrical transformers and other industrial equipment. They generally get into drinking water by improper waste disposal or leaking electrical industrial equipment. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for PCBs at 0.0005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to PCBs.

46. Pentachlorophenol: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that pentachlorophenol is a health concern at certain levels of exposure. This organic chemical is used as a wood preservative, herbicide, disinfectant, and defoliant. It generally gets into drinking water by runoff into surface water or leaching into ground water. This chemical has been shown to produce adverse reproductive effects and to damage the liver and kidneys of laboratory animals such as rats exposed to high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the liver and kidneys. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for pentachlorophenol at 0.001 parts per million (ppm) to protect against the risk of cancer or other adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to pentachlorophenol.

47. Styrene: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that styrene is a health concern at certain levels of exposure. This organic chemical is commonly used to make plastics and is sometimes a component of resins used for drinking water treatment. Styrene may get into drinking water from improper waste disposal. This chemical has been shown to damage the liver and nervous system in laboratory animals when exposed at high levels during their lifetimes. EPA has set the drinking water standard for styrene at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to styrene.

48. Tetrachloroethylene: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that tetrachloroethylene is a health concern at certain levels of exposure. This organic chemical has been a popular solvent, particularly for dry cleaning. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for tetrachloroethylene at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to tetrachloroethylene.

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49. Toluene: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that toluene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and in the manufacture of gasoline for airplanes. It generally gets into water by improper waste disposal or leaking underground storage tanks. This chemical has been shown to damage the kidney, nervous system, and circulatory system of laboratory animals such as rats and mice exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the liver, kidney and nervous system. EPA has set the drinking water standard for toluene at one part per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to toluene.

50. Toxaphene: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that toxaphene is a health concern at certain levels of exposure. This organic chemical was once a pesticide widely used on cotton, corn, soybeans, pineapples and other crops. When soil and climatic conditions are favorable, toxaphene may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for toxaphene at 0.003 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to toxaphene.

51. 2,4,5-TP: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 2,4,5-TP is a health concern at certain levels of exposure. This organic chemical is used as a herbicide. When soil and climatic conditions are favorable, 2,4,5-TP may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver and kidney of laboratory animals such as rats and dogs exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the nervous system. EPA has set the drinking water standard for 2,4,5-TP at 0.05 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 2,4,5-TP.

52. Xylenes: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that xylene is a health concern at certain levels of exposure. This organic chemical is used in the manufacture of gasoline for airplanes and as a solvent for pesticides, and as a cleaner and degreaser of metals. It usually gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and nervous system of laboratory animals such as rats and dogs exposed to high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for xylene at ten parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to xylene.

53. Antimony: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that antimony is a health concern at certain levels of exposure. This inorganic chemical occurs naturally in soils, ground water and surface waters and is often used in the flame retardant industry. It is also used in ceramics, glass, batteries, fireworks and explosives. It may get into drinking water through natural weathering of rock, industrial production, municipal waste disposal or manufacturing processes. This chemical has been shown to decrease longevity, and altered blood levels of cholesterol and glucose in laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for antimony at 0.006 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to antimony.

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54. Beryllium. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that beryllium is a health concern at certain levels of exposure. This organic metal occurs naturally in soils, ground water and surface waters and is often used in electrical equipment and electrical components. It generally gets into water from runoff from mining operations, discharge from processing plants and improper waste disposal. Beryllium compounds have been associated with damage to the bones and lungs and induction of cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. There is limited evidence to suggest that beryllium may pose a cancer risk via drinking water exposure. Therefore, EPA based the health assessment on non-cancer effects with an extra uncertainty factor to account for possible carcinogenicity. chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for beryllium at 0.004 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to beryllium.

55. Cyanide. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that cyanide is a health concern at certain levels of exposure. this inorganic chemical is used in electroplating, steel processing, plastics, synthetic fabrics and fertilizer products. It usually gets into water as a result of improper waste disposal. this chemical has been shown to damage the spleen, brain and liver of humans fatally poisoned with cyanide. EPA has set the drinking water standard for cyanide at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to cyanide.

56. Nickel. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nickel poses a health concern at certain levels of exposure. this inorganic metal occurs naturally in soils, ground water and surface waters and is often used in electroplating stainless steel and alloy products. It generally gets into water from mining and refining operations. This chemical has been shown to damage the heart and liver in laboratory animals when the animals are exposed to high levels over their lifetimes. EPA has set the drinking water standard at 0.1 parts per million (ppm) for nickel to protect against the risk of these adverse effects. Drinking Water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to nickel.

57. Thallium. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that thallium is a health concern at certain high levels of exposure. This inorganic metal is found naturally in soils and is used in electronics, pharmaceutical and the manufacture of glass and alloys. this chemical has been shown to damage the kidney, liver, brain and intestines of laboratory animals when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for thallium at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe respect to thallium.

58. Benzo(a)pyrene. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that benzo(a)pyrene is a health concern at certain levels of exposure. Cigarette smoke and charbroiled meats are common source of general exposure. The major source of benzo(a)pyrene in drinking water is the leaching from coal tar lining and sealants in water storage tanks. This chemical has been shown to cause cancer in animals such as rats and mice when the animals are exposed at high levels. EPA has set the drinking water standard for benzo(a)pyrene at 0.0002 parts per million (ppm) to protect against the risk of cancer. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to benzo(a) pyrene.

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59. Dalapon. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dalapon is a health concern at certain levels of exposure. this organic chemical is widely used herbicide. It may get into drinking water after application to control grasses in crops, drainage ditches and along railroads. This chemical has been shown to cause damage to the kidney and liver in laboratory animals when the animals are exposed to high levels over their lifetimes. EPA has set the drinking water standard for dalapon at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to dalapon.

60. Dichloromethane. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dichloromethane (methylene chloride) is a health concern at certain levels of exposure. This organic chemical is a widely used solvent. It is used in the manufacturer of paint remover, as a metal degreaser and as an aerosol propellant. It generally gets into drinking water after improper discharge of waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for dichloromethane at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe with respect to dichloromethane.

61. Di(2-ethylhexyl)adipate. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that di(2-ethylhexyl)adipate is a widely used plasticizer in a variety of products, including synthetic rubber, food packaging materials and cosmetics. It may get into drinking water after improper waste disposal. This chemical has been shown to damage liver and testes in laboratory animals such as rats and mice exposed to high levels. EPA has set the drinking water standard for di(2-ethylhexyl)adipate at 0.4 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to di(2-ethylhexyl)adipate.

62. Di(2-ethylhexyl)phthalate. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that di(2-ethylhexyl)phthalate is a widely used plasticizer, which is primarily used in the production of polyvinyl chloride (PVC) resins. It may get into drinking water after improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice exposed to high levels over their lifetimes. EPA has set the drinking water standard for di(2-ethylhexyl)phthalate at 0.004 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to di(2-ethylhexyl)phthalate.

63. Dinoseb. The United States Environmental Agency (EPA) sets drinking water standards and has determined that dinoseb is a health concern at certain levels of exposure. Dinoseb is a widely used pesticide and generally gets into drinking water after application on orchards, vineyards and other crops. this chemical has been shown to damage the thyroid and reproductive organs in laboratory animals such as rats exposed to high levels. EPA has set the drinking water standard for dinoseb at 0.007 parts per million (ppm) to protect against the adverse health effects. Drinking water which meets the EPA standard is associated with little to none on this risk and should be considered safe with respect to dinoseb.

64. Diquat. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that diquat is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control terrestrial and aquatic weeds. It may get into drinking water by runoff into surface water. This chemical has been shown to damage the liver, kidney and gastrointestinal tract and causes cataract formation in laboratory animals such as dogs and rats exposed at high levels over their

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lifetimes. EPA has set the drinking water standard for diquat at 0.02 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to diquat.

65. Endothall. The United States Environmental Protection Agency (EPA) has determined that endothall is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control terrestrial and aquatic weeds. It may get into water by runoff into surface water. This chemical has been shown to cause liver, kidney, gastrointestinal tract and reproductive system of laboratory animals such as rats and mice exposed at high levels over their lifetimes. EPA has set the drinking water standard for endothall at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to endothall.

66. Endrin. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that endrin is a health concern at certain levels of exposure. This organic chemical is a pesticide no longer registered for use in the United States. However, this chemical is persistent in treated oils and accumulates in sediments and aquatic and terrestrial biota. This chemical has been shown to cause damage to the liver, kidney and heart in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for endrin at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to endrin.

67. Glyphosate. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that glyphosate is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control grasses and weeds. It may get into drinking water by runoff into surface water. This chemical has been shown to cause damage to the liver and kidneys in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for glyphosate at 0.7 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to glyphosate.

68. Hexachlorobenzene. The United States Environmental Protection Agency (EPA) sets the drinking water standards and has determined that hexachlorobenzene is a health concern at certain levels of exposure. This organic chemical is produced as an impurity in the manufacture of certain solvents and hexachlorobenzene.

69. Hexachlorocyclopentadiene. The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that hexachlorocyclopentadiene is a health concern at certain levels of exposure. This organic chemical is used as an intermediate in the manufacture of pesticides and flame retardants. It may get into water by discharge from production facilities. This chemical has been shown to damage the kidney and the stomach of laboratory animals when exposed at high levels over their lifetimes. EPA has set the drinking water standard for hexachlorocyclopentadiene at 0.05 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to hexachlorocyclopentadiene.

70. Oxamyl. The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that oxamyl is a health concern at certain levels of exposure. This organic chemical is used as a pesticide for the control of insects and other pests. It may get into drinking water by runoff into surface water or leaching into ground water. This chemical has been shown to damage the kidneys of laboratory animals such as rats when exposed at high levels over their lifetimes. EPA has set the drinking water standard for oxamyl at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of the risk and should be considered safe with respect to oxamyl.

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71. Picloram. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that picloram is a health concern at certain levels of exposure. This organic chemical is used as a pesticide for broadleaf weed control. It may get into drinking water by runoff into surface water or leaching into ground water as a result of pesticide application and improper waste disposal. This chemical has been shown to cause damage to the kidneys and liver in laboratory animals such as rats when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for picloram at 0.5 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to picloram.

72. Simazine. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that simazine is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control annual grasses and broadleaf weeds. It may leach into ground water or runs off into surface water after application. This chemical may cause cancer in laboratory animals such as rats and mice exposed at high levels during their lifetimes. chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for simazine at 0.004 parts per million (ppm) to reduce the risk of cancer or other adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to simazine.

73. Trichlorobenzene. the United Sates Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,2,4-trichlorobenzene is a health concern at certain levels of exposure. this organic chemical is used as a dye carrier and as a precursor in herbicide manufacture. It generally gets into drinking water by discharges from industrial activities. This chemical has been shown to cause damage to several organs, including the adrenal glands. EPA has set the drinking water standard for 1,2,4-trichlorobenzene at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to 1,2,4-trichlorobenzene.

74. 1,1,2-Trichloroethane. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined 1,1,2-trichloroethane is a health concern at certain levels of exposure. This organic chemical is an intermediate in the production of 1,1-dichloroethylene. It generally gets into water by industrial discharges of wastes. This chemical has been shown to damage kidney and liver of laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for 1,1,2-trichloroethane at 0.005 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to 1,1,2-trichloroethane.

75. 2,3,7,8-TCDD (Dioxin). The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dioxin ia a health concern at certain levels of exposure. This organic chemical is an impurity in the production of some pesticides. It may get into drinking water by industrial discharge of wastes. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over a long period of time. EPA has set the drinking water standard for dioxin at 0.00000003 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe with respect to dioxin.

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(f) Public Notification by the Department for Any Public Water System Subject to 310 CMR 22.00. The Department may give notice to the public as required by 310 CMR 22.16 on behalf of the supplier of water or require a public water system or any person subject to 310 CMR 22.00 to provide public notice for any violation of 310 CMR 22.00, the content of which shall either satisfy the requirements of 310 CMR 22.16(1)(d), and/or be approved by the Department, prior to publication. The supplier of water remains legally responsible for ensuring that the requirements of 310 CMR 22.16 are met. The Department reserves the right to give notice to the public when not required by 310 CMR 22.16 in the event of a significant health problem.

(2) Special Requirements.

(a) Compliance with Secondary Maximum Contaminant Level and Public Notification For Fluoride. Community water systems that exceed the secondary maximum contaminant level for fluoride as determined by any sample taken in accordance with the requirements of 310 CMR 22.06, but do not exceed the maximum contaminant level for fluoride, shall report the exceedance to the Department within 48 hours of the time the supplier first learns of the analytic results which indicate an exceedance and initiate three additional analyses at the same sampling point within 30 days. If the average of these four analyses rounded to the same number of significant figures as the secondary maximum contaminant level for fluoride exceeds the applicable secondary maximum contaminant level, the supplier of water shall report the exceedance to the Department in accordance with 310 CMR 22.15 and shall send notice prescribed in 310 CMR 22.16, to all billing units annually, to all new billing units at the time service begins, and to the Department of Public Health. The supplier of water shall notify persons served by the water system of the exceedance by inclusion of a notice in the first set of water bills of the system issued after the exceedance and in any event by written notice within three months of the exceedance. The Department may require more extensive or frequent notification, including prominent posting in public places and notification of dentists and doctors.

22.17: Record Maintenance

All suppliers of water shall retain on their premises or at a convenient location near their premises in a form admissible as evidence in Massachusetts Courts the following records:

(1) Records of bacteriological analyses made pursuant to 310 CMR 22.00 shall be kept for not less than five years. Records of analysis for other than microbiological contaminants (including total coliform, fecal coliform, and heterotrophic plate count), residual disinfectant concentration, other parameters necessary to determine disinfection effectiveness (including temperature and pH measurements), and turbidity shall be retained for not less than 12 years. Actual laboratory reports may be kept, or data may be transferred to tabular summaries, provided that such summaries are in a form admissible as evidence in Massachusetts Courts and shall include at least the following information in a form that demonstrates an unbroken chain of custody of the samples analyzed from sampling through analysis and includes at least the following:

- (a) The date, place and time of sampling, the full name of the person who collected the sample and the agency or organization for which that person works;
- (b) Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample;
- (c) Date of analysis;
- (d) Laboratory and person responsible for performing analysis;
- (e) The analytical technique/method and instruments used and
- (f) The results of the analysis.

(2) Records of action taken by the system to correct violation of 310 CMR 22.00 shall be kept for a period not less than three years after the last action taken with respect to the particular violation involved.

(3) Copies of any written reports, summaries, or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by any local, State or Federal agency, shall be kept for a period not less than ten years after completion of the sanitary survey involved.

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- (4) Records concerning a variance or exemption granted to the system shall be kept for a period ending not less than five years following the expiration of such variance or exemption.
- (5) Records concerning the use of chemicals added to the water supply shall be kept for not less than five years. Said records shall include the information prescribed in 310 CMR 22.15(4).
- (6) Records of the sizes and materials of construction of all water mains, records of materials used in joints of water mains, and records of the materials of construction of all services shall be maintained.
- (7) Each supplier of water shall be responsible for maintaining current inventory information for the public water system in their charge and shall retain inventory records of public water systems for not less than 12 years. Said records shall include the information prescribed in 310 CMR 22.15(5).
- (8) A record of the most recent vulnerability determination, including the monitoring results and other data supporting the determination, the Department's findings based on the supporting data and any additional bases for such determination; except that it shall be kept in perpetuity or until a more current vulnerability determination has been issued.
- (9) A record of all current monitoring requirements and the most recent monitoring frequency decision pertaining to each contaminant, including the monitoring results and other data supporting the decision, the Department's findings based on the supporting data and any additional bases for such decision; except that the record shall be kept in perpetuity or until a more recent monitoring frequency decision has been issued.
- (10) A record of the most recent asbestos repeat monitoring determination, including the monitoring results and other data supporting the determination, the Department's findings based on the supporting data and any additional bases for the determination and the repeat monitoring frequency; except that these records shall be maintained in perpetuity or until a more current repeat monitoring determination has been issued.

22.18: Right of Entry

All suppliers of water shall authorize agents and employees of the Commonwealth, upon presentation of their credentials, to enter their premises, excluding dwelling places, without a warrant for the purpose of inspecting, surveying and sampling public water systems, whether or not the Commonwealth has evidence that the system is in violation of an applicable legal requirement.

22.19: Distribution System Requirements

In order to protect the distribution system of a public water system from contamination the following requirements shall be applied:

- (1) All service connections shall have a minimum residual water pressure at street level of at least 20 pounds per square inch under all design conditions of flow.
- (2) Water Storage Tanks: All water storage tanks used for the storage of ground or treated water which are connected to a distribution system of a public water system shall be covered and constructed and located so as to adequately protect the water from contamination. Tank vents and overflow pipes shall be properly screened to prevent contamination and not be directly connected to sanitary sewers or to storm drainage systems. Sewers, drains, standing water and similar sources of possible contamination must be kept at least 50 feet from the tank. Water main pipe, pressure tested to 50 pounds per square inch without leakage, may be used for gravity sewers at distances greater than 20 feet and less than 50 feet from said water storage tank.

22.19: continued

(3) Storage Reservoirs: Open or uncovered earth embankment or reinforced concrete reservoirs, which are connected to a distribution system of a public water system, and used to store ground or treated water whose intended purpose is to equalize hourly and daily fluctuations of water, may continue to be used provided that said facility complies with the requirements of 310 CMR 22.20A.

22.20A: Surface Water Treatment Rule

(1) General requirements.

(a) 310 CMR 22.20A establishes criteria under which filtration is required as a treatment technique for public water systems supplied by surface water sources and ground water sources under the direct influence of surface water. In addition, 310 CMR 22.20A establishes treatment technique requirements in lieu of maximum contaminant levels for the following contaminants:

1. *Giardia lamblia*,
2. Viruses,
3. Heterotrophic plate count bacteria,
4. *Legionella*, and
5. Turbidity.

(b) Each supplier of water with a surface water source, or ground water source under the direct influence of surface water, must provide treatment of that source water that complies with the treatment technique requirements set forth in 310 CMR 22.20A. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

1. At least 99.9% (3-log) removal and/or inactivation of *Giardia lamblia* cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer; and
2. At least 99.99% (4-log) removal and/or inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

(c) A supplier of water using a surface water source or ground water source under the direct influence of surface water shall be deemed in compliance with the requirements of 310 CMR 22.20A(1)(a) and (b) if:

1. It meets the requirements for avoiding filtration in 310 CMR 22.20A(2) and the disinfection requirements in 310 CMR 22.20A(3)(a); or
2. It meets the filtration requirements in 310 CMR 22.20A(4) and the disinfection requirements in 310 CMR 22.20A(3)(b).

(d) Each supplier of water using a surface water source or a ground water source under the direct influence of surface water must be operated by a certified operator in compliance with 310 CMR 22.11B.

(2) Criteria for avoiding filtration. A supplier of water that uses a surface water source must meet all of the conditions in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b) and is subject to 310 CMR 22.20A(2)(c) beginning June 29, 1991, unless the Department has notified it in writing that filtration is required. A supplier of water that uses a ground water source under the direct influence of surface water must meet all of the conditions in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b) and is subject to 310 CMR 22.20A(2)(c) beginning 18 months after the Department determines that it is under the direct influence of surface water, or June 29, 1991, whichever is later, unless the Department has notified it in writing that filtration is required. If the Department determines in writing, before June 29, 1991 that filtration is required, the supplier of water must have installed filtration and meet the criteria for filtered systems specified in 310 CMR 22.20A(3)(b) and 310 CMR 22.20A(4) by June 29, 1993. Within 18 months of the failure of a system using a surface water source or a ground water source under the direct influence of surface water to meet any one of the requirements in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b) or after June 29, 1993, whichever is later, the supplier of water must have installed filtration and meet the criteria for filtered systems specified in 310 CMR 22.20A(3)(b) and 310 CMR 22.20A(4).

(a) Source water quality conditions.

22.20A: continued

1. The fecal coliform concentration must be equal to or less than 20/100 ml. or the total coliform concentration must be equal to or less than 100/100 ml (measured as specified in 310 CMR 22.20A(5)(a)2. and 310 CMR 22.20A(5)(b)1. in representative samples of the source water immediately prior to the first or only point of disinfectant application in at least 90% of the measurements made for the six previous months that the system served water to the public on an ongoing basis. If a system measures both fecal and total coliform, the fecal coliform criterion, but not the total coliform criterion, in 310 CMR 22.20A(2)(a)1. must be met.
 2. The turbidity level cannot exceed 1.0 NTU (measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(b)2. in representative samples of the source water immediately prior to the first or only point of disinfectant application except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the Department that the higher turbidity does not do any of the following:
 - a. Interfere with disinfection.
 - b. Prevent maintenance of an effective disinfectant agent throughout the distribution system; or
 - c. Interfere with microbiological determinations.
 3. The turbidity level cannot exceed 5.0 NTU (at any time) unless:
 - a. The Department determines that any such event was caused by circumstances that were unusual and unpredictable; and
 - b. As a result of any such event, there have not been more than two events in the past 12 months the system served water to the public, or more than five events in the past 120 months the system served water to the public, in which the turbidity level exceeded 5.0 NTU. An "event" is a series of consecutive days during which at least one turbidity measurement each day exceeds 5.0 NTU.
- (b) Site-specific conditions.
1. A supplier of water must meet the requirements of 310 CMR 22.20A(3)(a)1. at least 11 of the 12 previous months that its system served water to the public on an ongoing basis, unless the system fails to meet the requirements during two of the 12 previous months that the system served water to the public, and the Department determines that at least one of the failures was caused by circumstances that were unusual and unpredictable.
 2. A supplier of water must meet the requirements of 310 CMR 22.20A(3)(a)2. at all times its system serves water to the public unless otherwise approved by the Department.
 3. A supplier of water must meet the requirements of 310 CMR 22.20A(3)(a)3. at all times its system serves water to the public unless the Department determines that any such failure was caused by circumstances that were unusual and unpredictable.
 4. A supplier of water must meet the requirements of 310 CMR 22.20A(3)(a)4. on an ongoing basis, unless the Department determines that any such failure was not caused by a deficiency in treatment of the source water.
 5. A supplier of water must maintain a Watershed Protection/Control Program that conforms to the Division's Watershed Resource Protection Plan (WRPP) Policy set forth in the Division of Water Supply "Guidelines and Policies for Public Water Systems", a copy of which is available from the Division of Water Supply. The Department will determine whether the Watershed Protection/Control Program is adequate to minimize contamination of the source water. The adequacy of the Watershed Protection/Control Program to prevent potential contamination of the source water and other contaminants must be based on:
 - a. The comprehensiveness of the watershed review;
 - b. The effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed; and the
 - c. Extent to which the water system has maximized land ownership and/or controlled land use within the watershed.
 - d. At a minimum, a Watershed Protection/Control Program shall include the following information:
 - (i) a watershed description, including maps and accompanying narratives of major physical features, components of the water system, and hydrological characteristics;

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- (ii) the watershed characteristics and activities which may have an adverse effect on source water quality;
 - (iii) a risk assessment and plan for controlling detrimental activities/events that may have an adverse impact on source water quality;
 - (iv) a plan for monitoring raw water quality parameters at locations vulnerable to contamination from detrimental activities;
 - (v) demonstrated control through land ownership and/or land use restrictions on all human activities within the watershed which may have an adverse impact on the microbiological quality of the source water; and
 - (vi) a management plan for staffing, training and maintaining effective day-to-day operations (including emergency response to contamination) and implementing a Department approved Watershed Control/Protection Program.
- e. The supplier of water shall submit an annual report on Department approved forms to the Department. The annual report shall identify any special concerns about the watershed and how they are being handled;
- f. Describes activities in the watershed that affect water quality, projects what adverse activities are expected to occur in the future, describes how the supplier of water expects to address them and otherwise complies with 310 CMR 22.20B(9) and 310 CMR 22.21(4), if applicable.
6. The supplier of water shall be subject to an annual on-site inspection by the Department or a person designated by the Department to assess the Watershed Protection/Control Program and disinfection treatment process. A report of the on-site inspection which summarizes all findings must be prepared every year. The on-site inspection must indicate to the Department's satisfaction that the Watershed Protection/Control Program and disinfection treatment process are adequately designed and maintained. The on-site inspection must include:
- a. A review of the effectiveness of the Watershed Protection/Control Program Plan;
 - b. A review of the physical condition of the source intake and how well it is protected;
 - c. A review of the system's equipment maintenance program to ensure there is low probability for failure of the disinfection process;
 - d. An inspection of the disinfection equipment for physical deterioration;
 - e. A review of operating procedures;
 - f. A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and
 - g. Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.
7. The public water system must not have been identified as a source of a waterborne disease outbreak, or if it has been so identified, the system must have been modified sufficiently to prevent another such occurrence, as determined by the Department.
8. A supplier of water must comply with the maximum contaminant level (MCL) for total coliform in 310 CMR 22.05(8) at least 11 months of the 12 previous months that the system served water to the public, on an ongoing basis, unless the Department determines that failure to meet this requirement was not caused by a deficiency in treatment of the source water.
9. A supplier of water must comply with the requirements for trihalomethanes in 310 CMR 22.07(2).
- (c) Treatment technique violations.
- 1. A supplier of water shall be deemed in violation of a treatment technique requirement if it:
 - a. fails to meet any one of the criteria in 310 CMR 22.20A(2)(a) or 310 CMR 22.20A(2)(b) and/or which the Department has notified in writing that filtration is required or
 - b. fails to install filtration by the date specified in 310 CMR 22.20A(2).
 - 2. A supplier of water that has not installed filtration is in violation of a treatment technique requirement if:

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- a. the turbidity level (measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(b)2.) in a representative sample of the source water immediately prior to the first or only point of disinfection exceeds 1 NTU unless five or fewer NTU units have been allowed by the Department, or
- b. its system is identified as a source of a waterborne disease outbreak.

(3) Disinfection. A supplier of water that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in 310 CMR 22.20A(3)(a) beginning December 29, 1991, unless the Department notifies it in writing that filtration is required. A supplier of water that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in 310 CMR 22.20A(3)(a) beginning December 29, 1991, or 18 months after the Department determines that the ground water source is under the influence of surface water, whichever is later, unless the Department has notified it in writing that filtration is required. If the Department has determined that filtration is required, the supplier of water must comply with any interim disinfection requirements the Department deems necessary before filtration is installed. A supplier of water that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in 310 CMR 22.20A(3)(b) beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A supplier of water that uses a ground water source under the direct influence of surface water and provides filtration treatment must provide disinfection treatment as specified in 310 CMR 22.20A(3)(b) by June 29, 1993, or beginning when filtration is installed, whichever is later. Failure to meet any requirement in 310 CMR 22.20A(3) after the applicable date is a treatment technique violation.

(a) Disinfection requirements for public water systems that do not provide filtration. A supplier of water that does not provide filtration treatment must provide disinfection treatment as follows:

1. The disinfection treatment must be sufficient to ensure at least 99.9% (3-log) inactivation of *Giardia lamblia* cysts and 99.99% (4-log) inactivation of viruses, every day the system serves water to the public, except any one day each month. Each day a system serves water to the public, the supplier of water must calculate the CT value(s) from the system's treatment parameters, using the procedure specified in 310 CMR 22.20A(5)(b)3., and determine whether this value(s) is sufficient to achieve the specified inactivation rates for *giardia lamblia* cysts and viruses. If a system uses a disinfectant other than chlorine, the supplier of water may demonstrate to the Department, through the use of a Department-approved protocol for on-site disinfection challenge studies or other information satisfactory to the Department, that $CT_{99.9}$ values other than those specified in Tables 2.1-22.20A and 3.1-22.20A in 310 CMR 22.20A(5)(b)3. or other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by 310 CMR 22.20A(3)(a).
2. The disinfection system must have redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system unless otherwise approved by the Department.
3. The residual disinfectant concentration in the water entering the distribution system, measured as specified in 310 CMR 22.20A(5)(a)5. and 310 CMR 22.20A(5)(b)5., cannot be less than 0.2 mg/l for more than four hours.
4. The residual disinfectant concentration in the distribution system measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in 310 CMR 22.20A(5)(a)5. and 310 CMR 22.20A(5)(b)6., cannot be undetectable in more than 5% of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)3., is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5% in one month, for any two consecutive months.

$$V = \frac{c + d + e}{a + b} \times 100$$

22.20A: continued

where:

- a = number of instances where the residual disinfectant concentration is measured;
- b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
- c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;
- d = number of instances where residual disinfectant concentration is detected and where the HPC is >500/ml; and
- e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

(b) Disinfection requirements for public water systems which provide filtration. A supplier of water that provides filtration treatment must provide disinfection treatment as follows:

1. The disinfection treatment must be sufficient to ensure that the total treatment processes of that system achieve at least 99.9% (3-log) inactivation and/or removal of *Giardia lamblia* cysts and at least 99.99% (4-log) inactivation and/or removal of viruses, as determined by the Department.
2. The residual disinfectant concentration in the water entering the distribution system, measured as specified in 310 CMR 22.20A(5)(a)5. and 310 CMR 22.20A(5)(c)2., cannot be less than 0.2 mg/l for more than four hours.
3. The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in 310 CMR 22.20A(5)(a)5. and 310 CMR 22.20A(5)(c)3., cannot be undetectable in more than 5% of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)3., is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus the value "V" in the following formula cannot exceed 5% in one month, for any two consecutive months.

$$V = \frac{c + d + e}{a + b} \times 100$$

where:

- a = number of instances where the residual disinfectant concentration is measured;
- b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
- c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;
- d = number of instances where no residual disinfectant concentration is detected and where the HPC is >500/ml; and
- e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

(4) Filtration. A supplier of water that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in 310 CMR 22.20A(3)(b), and filtration treatment which complies with the requirements of 310 CMR 22.20A(4) by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b), whichever is later. Failure to meet any requirement of 310 CMR 22.20A after the date specified in 310 CMR 22.20A(4) is a treatment technique violation.

(a) Conventional filtration treatment or direct filtration.

1. For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.5 NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.

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2. The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.
- (b) Slow sand filtration.
 1. For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.
 2. The turbidity level of representative samples of a system's filtered water must at no time exceed five NTU, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.
- (c) Diatomaceous earth filtration.
 1. For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to one NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.
 2. The turbidity level of representative samples of a system's filtered water must at no time exceed five NTU, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.
- (d) Other filtration technologies. A public water system may use a filtration technology not listed in 310 CMR 22.20A(4)(a) through 310 CMR 22.20A(4)(c) if it demonstrates to the Department, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of 310 CMR 22.20A(3)(b), consistently achieves 99.9% removal and/or inactivation of *Giardia lamblia* cysts and 99.99% removal and/or inactivation of viruses. For a supplier of water that makes this demonstration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95% of the month, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.
- (5) Analytical and monitoring requirements.
 - (a) Analytical requirements. Only the analytical method(s) specified in 310 CMR 22.20A(5)(a), or otherwise approved by EPA, may be used to demonstrate compliance with the requirements of 310 CMR 22.20A(2), 310 CMR 22.20A(3), and 310 CMR 22.20A(4). Measurements for pH, temperature, turbidity, and residual disinfectant concentrations must be conducted by a certified operator. Measurements for total coliform, fecal coliform, and HPC must be conducted by a laboratory certified by the Department to do such analyses. The following procedures shall be performed in accordance with the publications listed in the 310 CMR 22.20A(6). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the methods published in *Standard Methods for the Examination of Water and Wastewater* may be obtained from the American Public Health Association, 1015 Fifteenth Street, N.W., Washington, D.C. 20005; copies of the Minimal Medium ONPG-MUG Method as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliform and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg *et al.*), *Applied and Environmental Microbiology*, Volume 54, pp.1594-1601, June 1988 (as amended under Erratum, *Applied and Environmental Microbiology*, Volume 54, p. 3197, December 1988), may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, Colorado, 80235; and copies of the Indigo Method as set forth in the article "Determination of Ozone in Water by the Indigo Method" (Bader and Hoigne), may be obtained from *Ozone Science & Engineering*, Pergamon Press Ltd., Fairview Park, Elmsford, New York 10523. Copies may be inspected at the U.S. Environmental Protection Agency, Room EB15, 401 M Street, S.W., Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, N.W., Room 8401, Washington, D.C.
 1. Fecal coliform concentration - Method 908C (Fecal Coliform MPN Procedures), pp. 878-880, Method 908D (Estimation of Bacterial Density), pp. 880-882, or Method 909C (Fecal Coliform Membrane Filter Procedure), pp. 896-898, as set forth in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association *et al.*, 16th edition.

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2. Total coliform concentration - Measurements for total coliform shall be conducted using analytical methods specified at 310 CMR 22.05(6)(c)1&2.
3. Heterotrophic Plate Count - Method 907A (Pour Plate Method), pp. 864-866, as set forth in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association et al., 16th edition.
4. Turbidity - Method 214A (Nephelometric Method -Nephelometric Turbidity Units), pp. 134-136, as set forth in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association et al., 16th edition.
5. Residual disinfectant concentration - Residual disinfectant concentrations for free chlorine and combined chlorine (chloramines) must be measured by Method 408C (Amperometric Titration Method), pp. 303-306, Method 408D (DPD Ferrous Titrimetric Method), pp. 306-309, Method 408E (DPD Calorimetric Method), pp. 309-310, or Method 408F (Leuco Crystal Violet Method), pp. 310-313, as set forth in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association et al., 16th edition. Residual disinfectant concentrations for free chlorine and combined chlorine may also be measured by using DPD calorimetric test kits approved by the Department. Residual disinfectant concentrations for ozone must be measured by the Indigo Method as set forth in Bader, H., Hoigne, J., "Determination of Ozone in Water by the Indigo Method: A Submitted Standard Method": *Ozone Science and Engineering*, Vol. 4, pp. 169-176, Pergamon Press Ltd., 1982, or automated methods which are calibrated in reference to the results obtained by the Indigo Method on a regular basis, if approved by the Department. (Note: This method will be published in the 17th edition of *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association et al.; the Iodometric Method in the 16th edition may not be used.) Residual disinfectant concentrations for chlorine dioxide must be measured by Method 410B (Amperometric Method) or Method 410C (DPD Method), pp. 322-324, as set forth in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association et al., 16th edition.
6. Temperature - Method 212 (Temperature), pp. 126-127, as set forth in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association et al., 16th edition.
7. pH - Method 423 (pH Value), pp. 429-437, as set forth in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association et al., 16th edition.

(b) Monitoring requirements for systems that do not provide filtration. A supplier of water that uses a surface water source and does not provide filtration treatment must begin monitoring, as specified in 310 CMR 22.20A(5)(b) beginning May 1, 1990, unless the Department has notified it in writing that filtration is required, in which case the Department may specify alternative monitoring requirements, as appropriate, until filtration is in place. A supplier of water that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must begin monitoring as specified in 310 CMR 22.20A(5)(b) beginning December 31, 1990 or six months after the Department determines that the ground water source is under the direct influence of surface water, whichever is later, unless the Department has notified it in writing that filtration is required, in which case the Department may specify alternative monitoring requirements, as appropriate, until filtration is in place.

1. Fecal coliform or total coliform density measurements as required by 310 CMR 22.20A(2)(a)1. must be performed on representative source water samples immediately prior to the first or only point of disinfectant application. The supplier of water must sample for fecal or total coliform at the following minimum frequency each week the system serves water to the public:

<u>System size (persons served)</u>	<u>Samples/week¹</u>
< 500	1
501-3,300	2
3,301-10,000	3
10,001-25,000	4
>25,000	5

¹ Must be taken on separate days.

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In addition, one fecal or total coliform density measurement must be made every day the system serves water to the public and the turbidity of the source water exceeds 1 NTU (these samples count towards the weekly coliform sampling requirement) unless the Department determines that the supplier of water for logistical reasons outside of the supplier's control, cannot have the sample analyzed within 30 hours of collection.

2. Turbidity measurements as required by 310 CMR 22.20A(2)(a)2. must be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every four hours (or more frequently) that the system serves water to the public. A supplier of water may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Department.

3. The total inactivation ratio for each day that the system is in operation must be determined based on the $CT_{99.9}$ values in Tables 1.1 - 22.20A through 1.6-22.20A. 2.1-22.20A and 3.1-22.20A in 310 CMR 22.20A(5)(b)3. as appropriate. The parameters necessary to determine the total inactivation ratio must be monitored as follows:

- The temperature of the disinfected water must be measured at least once per day at each residual disinfectant concentration sampling point.
- If the system uses chlorine, the pH of the disinfected water must be measured at least once per day at each chlorine residual disinfectant concentration sampling point.
- The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow.
- The residual disinfectant concentration(s) ("C") of the water before or at the first customer must be measured each day during peak hourly flow.
- If a system uses a disinfectant other than chlorine, the system may demonstrate to the Department, through the use of a Department-approved protocol for on-site disinfection challenge studies or other information satisfactory to the Department, that $CT_{99.9}$ values other than those specified in Tables 2.1-22.20A and 3.1-22.20A in 310 CMR 22.20A(5)(b)3. are adequate to demonstrate that the system is achieving the minimum inactivation rates required by 310 CMR 22.20A(3)(a)1.

TABLE 1.1 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION OF
GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5°C OR LOWER*

	Free Residual	pH						
	(mg l)	<u>< 6.0</u>	<u>6.5</u>	<u>7.0</u>	<u>7.5</u>	<u>8.0</u>	<u>8.5</u>	<u>< 9.0</u>
≤	0.4	137	163	195	237	277	329	390
	0.6	141	168	200	239	286	342	407
	0.8	145	172	205	246	295	354	422
	1.0	148	176	210	253	304	365	437
	1.2	152	180	215	259	313	376	451
	1.4	155	184	221	266	321	387	464
	1.6	157	189	226	273	329	397	477
	1.8	162	193	231	279	338	407	489
	2.0	165	197	236	286	346	417	500
	2.2	169	201	242	297	353	426	511
	2.4	172	205	247	298	361	435	522
	2.6	175	209	252	304	368	444	533
	2.8	178	213	257	310	375	452	543
	3.0	181	217	261	316	382	460	552

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

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TABLE 1.2 - 310 CMR 22.20A
CT VALUES (CT_{99.9}) FOR 99.9% INACTIVATION OF *GIARDIA*
LAMBLIA CYSTS BY FREE CHLORINE AT 5.0°C*

		pH						
Free Residual								
(mg/l)		≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤	0.4	97	117	139	166	198	236	279
	0.6	100	120	143	171	204	244	291
	0.8	103	122	146	175	210	252	301
	1.0	105	125	149	179	216	260	312
	1.2	107	127	152	183	221	267	320
	1.4	109	130	155	187	227	274	329
	1.6	111	132	158	192	232	281	337
	1.8	114	135	162	196	238	287	345
	2.0	116	138	165	200	243	294	353
	2.2	118	140	169	204	248	300	361
	2.4	120	143	172	209	253	306	368
	2.6	122	146	175	213	258	312	375
	2.8	124	148	178	217	263	318	382
	3.0	126	151	182	221	268	324	389

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature, and at the higher pH.

TABLE 1.3 - 310 CMR 22.20A
CT VALUES (CT_{99.9}) FOR 99.9% INACTIVATION OF *GIARDIA*
LAMBLIA CYSTS BY FREE CHLORINE AT 103°C*

		pH						
Free Residual								
(mg/l)		≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤	0.4	73	88	104	125	149	177	209
	0.6	75	90	107	128	153	183	218
	0.8	78	92	110	131	158	189	226
	1.0	79	94	112	134	162	195	234
	1.2	80	95	114	137	166	200	240
	1.4	82	98	116	140	170	206	247
	1.6	83	99	119	144	174	211	253
	1.8	86	101	122	147	179	215	259
	2.0	87	104	124	150	182	221	265
	2.2	89	105	127	153	186	225	271
	2.4	90	107	129	157	190	230	276
	2.6	92	110	131	160	194	234	281
	2.8	93	111	134	163	197	239	287
	3.0	95	113	137	166	201	243	292

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature, and at the higher pH.

22.20A: continued

TABLE 1.4 - 310 CMR 22.20A
CT VALUES (CT_{99.9}) FOR 99.9% INACTIVATION OF *GIARDIA*
LAMBLIA CYSTS BY FREE CHLORINE AT 15°C*

		pH						
Free Residual								
(mg/l)		≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤	0.4	49	59	70	83	99	118	140
	0.6	50	60	72	86	102	122	146
	0.8	52	61	73	88	105	126	151
	1.0	53	63	75	90	108	130	156
	1.2	54	64	76	92	111	134	160
	1.4	55	65	78	94	114	137	165
	1.6	56	66	79	96	116	141	169
	1.8	57	68	81	98	119	144	173
	2.0	58	69	83	100	122	147	177
	2.2	59	70	85	102	124	150	181
	2.4	60	72	86	105	127	153	184
	2.6	61	73	88	107	129	156	188
	2.8	62	74	89	109	132	159	191
	3.0	63	76	91	111	134	162	195

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature, and at the higher pH.

TABLE 1.5 - 310 CMR 22.20A
CT VALUES (CT_{99.9}) FOR 99.9% INACTIVATION OF *GIARDIA*
LAMBLIA CYSTS BY FREE CHLORINE AT 20°C*

		pH						
Free Residual								
(mg/l)		≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤	0.4	36	44	52	62	74	89	105
	0.6	38	45	54	64	77	92	109
	0.8	39	46	55	66	79	95	113
	1.0	39	47	56	67	81	98	117
	1.2	40	48	57	69	83	100	120
	1.4	41	49	58	70	85	103	123
	1.6	42	50	59	72	87	105	126
	1.8	43	51	61	74	89	108	129
	2.0	44	52	62	75	91	110	132
	2.2	44	53	63	77	93	113	135
	2.4	45	54	65	78	95	115	138
	2.6	46	55	66	80	97	117	141
	2.8	47	56	67	81	99	119	143
	3.0	47	57	68	83	101	122	146

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature, and at the higher pH.

22.20A: continued

TABLE 1.6 - 310 CMR 22.20A
CT VALUES (CT_{99.9}) FOR 99.9% INACTIVATION OF *GIARDIA*
LAMBLIA CYSTS BY FREE CHLORINE AT 25°C* AND HIGHER
pH

Free Residual		pH						
(mg/l)		≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤	0.4	24	29	35	42	50	59	70
	0.6	25	30	36	43	51	61	73
	0.8	26	31	37	44	53	63	75
	1.0	26	31	37	45	54	65	78
	1.2	27	32	38	46	55	67	80
	1.4	27	33	39	47	57	69	82
	1.6	28	33	40	48	58	70	84
	1.8	29	34	41	49	60	72	86
	2.0	29	35	41	50	61	74	88
	2.2	30	35	42	51	62	75	90
	2.4	30	36	43	52	63	77	92
	2.6	31	37	44	53	65	78	94
	2.8	31	37	45	54	66	80	96
	3.0	32	38	46	55	67	81	97

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature, and at the higher pH.

TABLE 2.1 - 310 CMR 22.20A
CT VALUES (CT_{99.9}) FOR 99.9% INACTIVATION OF
GIARDIA LAMBLIA CYSTS BY CHLORINE DIOXIDE AND OZONE*

	Temperature					
	≤ 1°C	5°C	10°C	15°C	20°C	≥ 25°C
Chlorine dioxide	63	26	23	19	15	11
Ozone	2.9	1.9	1.4	0.95	0.72	0.48

* These CT values achieve greater than 99.99% inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature for determining CT_{99.9} values between indicated temperatures.

TABLE 3.1 - 310 CMR 22.20A
CT VALUES (CT_{99.9}) FOR 99.9% INACTIVATION
OF *GIARDIA LAMBLIA* CYSTS BY CHLORAMINE*

Temperature					
≤ 1°C	5°C	10°C	15°C	20°C	≥ 25°C
3,800	2,200	1,850	1,500	1,100	750

* These values are for pH values of 6 to 9. These CT values may be assumed to achieve greater than 99.99% inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system must demonstrate, based on on-site studies or other information, as approved by the State, that the system is achieving at least 99.99% inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature for determining CT_{99.9} values between indicated temperatures.

22.20A: continued

4. The total inactivation ratio must be calculated as follows:
- If the system uses only one point of disinfectant application, the supplier of water may determine the total inactivation ratio based on either of the following two methods:
 - One inactivation ratio ($CT_{calc}/CT_{99.9}$) is determined before or at the first customer during peak hourly flow and if the $CT_{calc}/CT_{99.9} \geq 1.0$, the 99.9% *Giardia lamblia* inactivation requirement has been achieved; or
 - Successive $CT_{calc}/CT_{99.9}$ values, representing sequential inactivation ratios, are determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the following method must be used to calculate the total inactivation ratio:

(A) Determine $\frac{CT_{calc}}{CT_{99.9}}$ for each sequence.

(B) Add the $\frac{(CT_{calc})}{(CT_{99.9})}$ values together $\frac{(CT_{calc})}{(CT_{99.9})}$

(C) If $\frac{(CT_{calc})}{CT_{99.9}} \geq 1.0$, then the 99.9% *Giardia lamblia* inactivation requirement has been achieved.

- If the system uses more than one point of disinfectant application before or at the first customer, the supplier of water must determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The $CT_{calc}/CT_{99.9}$ value of each sequence and

$$\frac{CT_{calc}}{CT_{99.9}}$$

must be calculated using the method in 310 CMR 22.20A(5)(b)4.a.(ii) to determine if the supplier of water is in compliance with 310 CMR 22.20A(3)(a).

- Although not required, the total percent inactivation for a system with one or more points of residual disinfectant concentration following equation:

$$\text{Percent Inactivation} = 100 - \frac{100}{10^z}$$

$$\text{where } z = 3 \times \sum \frac{(CT_{calc})}{(CT_{99.9})}$$

5. The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies prescribed below:

<u>System size by population</u>	<u>Samples/day*</u>
≤ 500	1
501-1,000	2
1,001-2,500	3
2,501-3,300	4

* The day's samples cannot be taken at the same time. The sampling intervals are subject to Department review and approval.

If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the supplier of water must take a grab sample every four hours until the residual concentration is equal to or greater than 0.2 mg/l.

22.20A: continued

6. The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliform are sampled, as specified in 310 CMR 22.05, except that the Department may allow a supplier of water which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, to take disinfectant residual samples at points other than the total coliform sampling points if the Department determines that such points are more representative of treated (disinfected) water quality within the distribution system.

a. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)3., may be measured in lieu of residual disinfectant concentration.

(c) Monitoring requirements for systems using filtration treatment. A supplier of water that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with 310 CMR 22.20A(5)(c) beginning June 29, 1993, or when filtration is installed, whichever is later.

1. Turbidity measurements as required by 310 CMR 22.20A(4) must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public. A supplier of water may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Department. For any systems using slow sand filtration, the Department may reduce the sampling frequency to no less than once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance.

2. The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:

<u>System size by population</u>	<u>Samples/day*</u>
≤500	1
501-1,000	2
1,001-2,500	3
2,501-3,300	4

* The day's samples cannot be taken at the same time. The sampling intervals are subject to Department review and approval.

If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the supplier of water must take a grab sample every four hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/l.

3. The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliform are sampled, as specified in 310 CMR 22.05, except that the Department may allow a supplier of water which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points if the Department determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)3., may be measured in lieu of residual disinfectant concentration.

22.20A: continued

(6) Reporting and recordkeeping requirements.

(a) A supplier of water that uses a surface water source and does not provide filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(a) beginning May 1, 1990, unless the Department has notified the supplier of water in writing that filtration is required in writing, in which case the Department may specify alternative reporting requirements, as appropriate, until filtration is in place. A supplier of water that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(a) beginning December 31, 1990 or six months after the Department determines that the ground water source is under the direct influence of surface water, whichever is later, unless the Department has notified it in writing that filtration is required in which case the Department may specify alternative reporting requirements, as appropriate, until filtration is in place.

1. Source water quality information must be reported to the Department within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

- a. The cumulative number of months for which results are reported.
- b. The number of fecal and/or total coliform samples, whichever are analyzed during the month (if a system monitors for both, only fecal coliform must be reported), the dates of sample collection, and the dates when the turbidity level exceeded one NTU.
- c. The number of samples during the month that had equal to or less than 20/100 ml fecal coliform and/or equal to or less than 100/100 ml total coliform, whichever are analyzed.
- d. The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous six months the system served water to the public.
- e. The cumulative number of samples that had equal to or less than 20/100 ml fecal coliform or equal to or less than 100/100 ml total coliform, whichever are analyzed, during the previous six months the system served water to the public.
- f. The percentage of samples that had equal to or less than 20/100 ml fecal coliform or equal to or less than 100/100 ml total coliform, whichever are analyzed, during the previous six months the system served water to the public.
- g. The maximum turbidity level measured during the month, the date(s) of occurrence for any measurement(s) which exceeded five NTU, and the date(s) the occurrence(s) was reported to the Department.
- h. For the first 12 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded five NTU, and after one year of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded five NTU in the previous 12 months the system served water to the public.
- i. For the first 120 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded five NTU, and after ten years of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded five NTU in the previous 120 months the system served water to the public.

2. Disinfection information specified in 310 CMR 22.20A(5)(b) must be reported to the Department within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

- a. For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.
- b. The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the Department was notified of the occurrence.
- c. The daily residual disinfectant concentration(s) (in mg/l) and disinfectant contact time(s) (in minutes) used for calculating the CT value(s).
- d. If chlorine is used, the daily measurement(s) of pH of disinfected water following each point of chlorine disinfection.
- e. The daily measurement(s) of water temperature in °C following each point of disinfection.

22.20A: continued

- f. The daily CTcalc and CTcalc/CT_{99.9} values for each disinfectant measurement or sequence and the sum of all CTcalc/CT_{99.9} values ((CTcalc/CT_{99.9})) before or at the first customer.
- g. The daily determination of whether disinfection achieves adequate *Giardia* cyst and virus inactivation, i.e., whether (CTcalc/CT_{99.9}) is at least 1.0 or, where disinfectants other than chlorine are used, other indicator conditions that the Department determines are appropriate, are met.
- h. The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to 310 CMR 22.20A(3):
 - (i) Number of instances where the residual disinfectant concentration is measured;
 - (ii) Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
 - (iii) Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;
 - (iv) Number of instances where the residual disinfectant concentration is detected and where HPC is >500/ml;
 - (v) Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml;
 - (vi) For the current and previous month the system served water to the public, the value of "V" in the following formula:

$$V = \frac{c + d + e}{a + b} \times 100$$

where

- a = the value in 310 CMR 22.20A(6)(a)2.h.(i).
- b = the value in 310 CMR 22.20A(6)(a)2.h.(ii)
- c = the value in 310 CMR 22.20A(6)(a)2.h.(iii)
- d = the value in 310 CMR 22.20A(6)(a)2.h.(iv)
- e = the value in 310 CMR 22.20A(6)(a)2.h.(v)
- i. A system need not report the data listed in 310 CMR 22.20A(6)(a)2.a. and 310 CMR 22.20A(6)(a)2.c. through 310 CMR 22.20A(6)(a)2.f. if all data listed in 310 CMR 22.20A(6)2.a. through 310 CMR 22.20A(6)(a)2.f. remains on file at the system, and the Department determines that:
 - (i) The supplier of water has submitted to the Department all the information required by 310 CMR 22.20A(6)(a)2.a. through 310 CMR 22.20A(6)(a)2.h. for at least 12 months; and
 - (ii) The Department has determined that the system is not required to provide filtration treatment.
- 3. No later than January 10th of each year, each supplier of water must provide to the Department a report which summarizes its compliance with all watershed control program requirements specified in 310 CMR 22.20A(2)(b)5.
- 4. No later than January 10th of each year each system must provide to the Department a report on the on-site inspection conducted during that year pursuant to 310 CMR 22.20A(2)(b)6. unless the on-site inspection was conducted by the Department.
- 5. Each supplier of water, upon discovering that a waterborne disease outbreak potentially attributable to its water system has occurred, must report that occurrence to the Department as soon as possible, but no later than by the end of the next business day.
- 6. If at any time the turbidity exceeds five NTU, the supplier of water must inform the Department as soon as possible, but no later than the end of the next business day.
- 7. If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the supplier of water must notify the Department as soon as possible, but no later than by the end of the next business day. The supplier of water also must notify the Department by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within four hours.
- (b) A supplier of water that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(b) beginning June 29, 1993, or when filtration is installed, whichever is later.

22.20A: continued

1. Turbidity measurements as required by 310 CMR 22.20A(5)(c)1. must be reported within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

- a. The total number of filtered water turbidity measurements taken during the month.
- b. The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in 310 CMR 22.20A(4) for the filtration technology being used.
- c. The date and value of any turbidity measurements taken during the month which exceed five NTU.

2. Disinfection information specified in 310 CMR 22.20A(5)(c) must be reported to the Department within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

- a. For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.
- b. The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the Department was notified of the occurrence.
- c. The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to 310 CMR 22.20A(3):
 - (i) Number of instances where the residual disinfectant concentration is measured;
 - (ii) Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
 - (iii) Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;
 - (iv) Number of instances where no residual disinfectant concentration is detected and where HPC is >500/ml;
 - (v) Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml;
 - (vi) For the current and previous month the system serves water to the public, the value of "V" in the following formula:

$$V = \frac{c + d + e}{a + b} \times 100$$

where

- a = the value in 310 CMR 22.20A(6)(b)2.c.(i)
- b = the value in 310 CMR 22.20A(6)(b)2.c.(ii)
- c = the value in 310 CMR 22.20A(6)(b)2.c.(iii)
- d = the value in 310 CMR 22.20A(6)(b)2.c.(iv)
- e = the value in 310 CMR 22.20A(6)(b)2.c.(v)

d. A supplier of water need not report the data listed in 310 CMR 22.20A(6)(b)2.a. if all data listed in 310 CMR 22.20A(6)(b)2.a. through 310 CMR 22.20A(6)(b)2.c. remains on file at the system and the Department determines that the system has submitted all the information required by 310 CMR 22.20A(6)(b)2.a. through 310 CMR 22.20A(6)(b)2.c. for at least 12 months.

3. A supplier of water, upon discovering that a waterborne disease outbreak potentially attributable to its water system has occurred, must report that occurrence to the Department as soon as possible, but no later than by the end of the next business day.

4. If at any time the turbidity exceeds five NTU, the supplier of water must inform the Department as soon as possible, but no later than the end of the next business day.

5. If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the supplier of water must notify the Department as soon as possible, but no later than by the end of the next business day. The system also must notify the Department by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within four hours.

22.20A: continued

(7) Review of Filtration Determinations

- (a) The Department's determination whether a supplier of water must provide filtration will be made in writing based on the criteria set forth in 310 CMR 22.20A(2). The supplier of water shall publish a copy of the Department's determination in a newspaper of general circulation in the area served by the supplier of water within ten days of receipt of the same. The determination will include a statement that the supplier of water and persons served by the system may request a hearing in accordance with 310 CMR 22.20A(7)(b). Within ten days of publication, the supplier of water shall submit an affidavit to the Department attesting to the fact that the determination has been published.
- (b) The supplier of water, and any person served by the system, may request review of the determination at a public hearing by submitting a written request to the Regional Director at the Department's Regional Office that serves the area where the public water system at issue is located within 15 days of the date of publication.
- (c) Following receipt of a request for a public hearing, the Department will give notice of the hearing by mail to the supplier of water and, if the request was made by a person other than the supplier of water, to the person who submitted the request. The supplier of water shall publish a copy of the notice of hearing in a newspaper of general circulation in the area served by the system within ten days of receipt of the same. Within ten days of publication, the supplier of water shall submit an affidavit to the Department attesting to the fact that the notice has been published.
- (d) The Department will accept written comments from the public relevant to the determination up to at least 14 days following the hearing. A determination following the hearing that a supplier of water must provide filtration will not be subject to further review; a determination that a supplier of water meets all of the criteria for avoiding filtration will be subject to the Department's on-going review. In the event the Department finds that a supplier of water no longer meets any one of the criteria for avoiding filtration, the Department will issue a determination in writing that will be subject to review at a public hearing in accordance with 310 CMR 22.20A(7).

22.20B: Surface Water Supply Protection

- (1) To protect surface waters used as sources of drinking water supply from contamination, the requirements of 310 CMR 22.20B shall apply to all land and watercourses used as or tributary to a public water system except:
 - (a) Rivers and streams used as sources of supply when the rivers and streams are not impounded at some point by means of a dam or dike to create a reservoir at which the water supply intake is located, and such rivers and streams have been designated as Class B drinking water sources pursuant to 314 CMR 4.00 (the Department's Surface Water Quality Standards).
 - (b) Certain watercourses or bodies of water used as sources of public water supply where conditions are imposed by specific legislation.
 - (c) Certain watercourses or bodies of water where in the express written opinion of the Department sufficient provisions have been made by means of treatment, storage, restrictions on the time of diversion, or other means to assure an acceptable quality of water.
 - (d) Emergency sources approved by the Department under the provisions of M.G.L. 21G.
- (2)
 - (a) All on-site subsurface sewage disposal systems, as defined in 310 CMR 15.000 (Title 5), shall be in compliance with the requirements of 310 CMR 15.000.
 - (b) No hitching or standing place for horses, cattle or other animals shall be located, constructed, or maintained within 100 feet of the high water mark of such source of water supply or tributary thereto.
- (3) No human excrement, or compost containing human excrement, or municipal, commercial or industrial refuse or waste product or polluting liquid or other substance which in the opinion of the Department is of a nature poisonous or injurious either to human beings or animals, or other putrescible organic matter whatsoever, shall be discharged directly into or at any place from which such liquid or substance may flow or be washed or carried into said source of water supply or tributary thereto.

22.20B: continued

(4) No burial shall be made, except by permission in writing by the Board of Water Commissioners or like body having jurisdiction over such source of supply, in any cemetery or other place within 100 feet of the high water mark of a source of public water supply or tributary thereto. No lands not under the control of cemetery authorities and used for cemetery purposes, from which lands the natural drainage flows into said source of water supply or tributary thereto, shall be taken or used for cemetery purposes until a plan and sufficient description of the lands is presented to the Department and until such taking or use is expressly approved in writing by the Department.

(5) No system of sewers or other works for the collection, conveyance, disposal, or purification of domestic, municipal, commercial or industrial sewage or drainage, or other hazardous or putrescible matter whatsoever shall be constructed or maintained at any place within the watershed of such source of water supply or tributary thereto unless such system is in accordance with the State Environmental Code (310 CMR 11.00 to 310 CMR 18.00, inclusive) MGLc. 21, 26-53 and 314 CMR 7.00, and the State Plumbing Code (248 CMR 1.01 through 2.22). Where these codes are not applicable the plans and specifications shall be approved in writing by the Department prior to construction.

(6) No public or private hospital or other place intended for the treatment of persons afflicted with a contagious or infectious disease, and no manufacturing or processing plant producing wastes which are toxic or injurious either to human beings or animals, shall, until the location thereof has been expressly approved in writing by the Department, be located or constructed at any place within the watershed of a source of public water supply or tributary thereto. No such facility shall be maintained at any place within the watershed, unless the facility has complied with all the provisions required by the Department or orders issued by the Department, for the treatment or disposal of sewage, drainage, or other hazardous substances or matter, which may be discharged therefrom.

(7) No person shall wade or bathe in any source of drinking water supply, and no person shall, unless permitted by written permit by the Board of Water Commissioners or like body having jurisdiction over such source of supply, fish in; enter or go in any boat, seaplane, or other contrivance; enter upon the ice for any purpose, including the cutting or taking of ice; or cause any animal to go in or upon such source of water supply or tributary thereto.

(8) All reports which may be made to any board of health, or to any health officer of any town, of cases of contagious or infectious disease occurring within the watershed of such source of water supply or tributary thereto, shall be open to inspection at all reasonable times by the Board of Water Commissioners or like body having jurisdiction over such source of supply, by its officers or agents, and by the Department.

(9) The supplier of water shall cause regular and thorough inspections to be made of watersheds Zones A, B, and C to ascertain compliance with 310 CMR 22.20B. It shall be the duty of the aforesaid supplier of water to cause copies of any rules and regulations violated to be served upon the persons violating the same together with notices of such violations. If such persons do not immediately comply with the rules and regulations, it shall be the further duty of the aforesaid supplier of water to take appropriate action to enjoin such violations and to promptly notify the Department of such violations. The aforesaid supplier of water shall report to the Department in writing annually, prior to the 30th day of January, the results of the regular inspections made during the preceding calendar year. The report shall state the number of inspections which were made, the number of violations found, the number of notices served, the number of violations abated and the general condition of the watershed at the time of the last inspection.

(10) No person shall apply herbicides to any surface water body including but not limited to any reservoir and their tributaries, which serve as a source of public water supply without a permit issued by the Department pursuant to M.G.L. c. 111, § 5E. This requirement does not apply to application by public water systems of algacides containing copper for control of taste and odor.

22.21: Groundwater Supply Protection

The following requirements shall apply to all persons to protect groundwaters used as sources of public drinking water supply from contamination:

(1) Source Approval

(a) No public water supply well or wellfield shall be constructed, expanded or replaced, and no water supply well or wellfield shall be placed on-line in a public water system, without the prior written approval of the Department. Persons seeking such approval are directed to follow the procedures set forth in the Division of Water Supply's "Guidelines and Policies for Public Water Systems," as amended.

All requests for source approval, or approval of Zone II and III delineations, shall be submitted to the Department's Regional Office serving the area where the proposed well or wellfield is located.

In determining whether to grant such approval, the Department shall apply the criteria set forth in 310 CMR 22.21 and the "Guidelines and Policies for Public Water Systems." Copies of the "Guidelines and Policies for Public Water Systems" are available for a nominal fee from the State Book Store, State House, Room 116, Boston, Massachusetts and 21 Elm Street, Springfield, Massachusetts.

(b) No public water supply well or wellfield designed to pump less than 100,000 gallons per day shall be constructed, expanded or replaced, or placed on-line, unless the Department finds in writing:

1. that the proponent has satisfactorily complied with the Division of Water Supply's "Guidelines and Policies for Public Water Systems," as amended;
2. that the source of water supply for the well or wellfield will achieve all applicable water quality standards set forth in the Massachusetts Drinking Water Regulations, 310 CMR 22.00;
3. that the proponent has properly determined the Zone I of the proposed well or wellfield;
4. that the Zone I of the proposed well or wellfield is owned or controlled by the supplier of water; and
5. that current and/or future land uses within the Zone I are limited to those directly related to the provision of public drinking water or will have no significant adverse impact on water quality.

In addition, the Department may require the proponent to delineate Zones II and III, and submit a groundwater monitoring well program plan for approval if the Department finds that existing or proposed land uses within the Interim Wellhead Protection Area of the proposed well or wellfield, determined in accordance with 310 CMR 22.21(1)(i), may pose a threat to water quality.

(c) No public water supply well or wellfield designed to pump 100,000 gallons per day or more shall be constructed, expanded or replaced unless the Department finds in writing:

1. that the proponent has met all the requirements set forth in 310 CMR 22.21(1)(b)1. through 310 CMR 22.21(1)(b)5.;
2. that the proponent has properly delineated the Zones II and III of the proposed well or wellfield;
3. that the proponent has submitted a groundwater monitoring well program plan designed to evaluate the water quality impacts of land uses within the Zone II of the proposed well or wellfield; and
4. that the proponent has drafted wellhead protection zoning or nonzoning controls that prohibit siting within the Zone II the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) unless designed in accordance with the performance standards specified therein, and has complied with the nitrate management requirement of 310 CMR 22.21(2)(d).

(d) No public water supply well or wellfield designed to pump 100,000 gallons per day or more shall be placed on-line unless:

1. a groundwater monitoring well program plan approved by the Department has been fully implemented (i.e. the monitoring wells are operational and the sampling frequency and parameters have been approved by the Department); and

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2. the cities and towns in which any part of the Zone II of the proposed well or wellfield is located have wellhead protection zoning or nonzoning controls in effect that prohibit siting within the Zone II the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) unless designed in accordance with the performance standards specified therein. If the public water system is owned or controlled by an entity other than a municipality, the proponent must demonstrate to the Department's satisfaction that it has used its best efforts to have all cities and towns in which the Zone II is located establish such zoning or nonzoning controls.
- (e) Notwithstanding 310 CMR 22.21(1)(d)(2), no public water supply well or wellfield designed to pump 100,000 gallons per day or more that will be used in a public water system owned or operated by a municipality, and is located within that municipality, shall be placed on-line unless the municipality has wellhead protection zoning or nonzoning controls in effect that prohibit siting within the Zone II the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) unless designed in accordance with the performance standards specified therein. If the Zone II of a municipal public water system extends into another municipality, the water supplier must also demonstrate to the Department's satisfaction that it has used its best efforts to have all cities and towns into which the Zone II extends establish such zoning or nonzoning controls within the Zone II.
- (f) Notwithstanding any other regulatory provision to the contrary, the Department may waive the requirement that the proponent of a public water supply well or wellfield delineate the Zone II, provided:
 1. the proponent has properly delineated the Zone III;
 2. each city and town in which the Zone III of the proposed well or wellfield is located has wellhead protection zoning or nonzoning controls in effect that prohibit within the Zone III the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) unless designed in accordance with the performance standards specified therein;
 3. the proponent has submitted a groundwater monitoring well program plan designed to evaluate the water quality impacts of land uses within the Zone III of the proposed well or wellfield; and
 4. the desired relief can be granted without substantial detriment to the public good.

In the event the Department waives the requirement that the proponent delineate the Zone II of a proposed public water supply well or wellfield, the supplier of water shall fully implement the groundwater monitoring well program plan approved by the Department before placing the well or wellfield on-line (i.e. the monitoring wells shall be operational and the sampling frequencies and parameters shall have been approved by the Department)
- (g) In determining whether a proponent has properly determined the Zone I or delineated the Zones II or III of a well or wellfield, or adequately designed a groundwater monitoring well program plan, the Department shall apply the criteria set forth in the Division of Water Supply's "Guidelines and Policies for Public Water Systems," as amended.
- (h) Any person who receives Department approval for a public water supply well or wellfield designed to pump 100,000 gallons per day or more that is not a replacement withdrawal point shall obtain a permit for any withdrawal, in accordance with the Water Management Act, M.G.L. c. 21G, and 310 CMR 36.00.
- (i) If the Department has not approved the Zone II for a public water supply well or wellfield, the Department will utilize the Interim Wellhead Protection Area as defined in 310 CMR 22.02.
- (j) The proponent may meet the requirements set forth in 310 CMR 22.21(1)(d)2. by demonstrating that existing rights in perpetuity or for a specific period of years stated in the form of a restriction, easement, covenant or condition in a deed or other instrument prohibit the siting of the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) within the Zone II.
- (k) The proponent may meet the requirements set forth in 310 CMR 22.21(1)(f)2. by demonstrating that existing rights in perpetuity or for a specific period of years stated in the form of a restriction, easement, covenant or condition in a deed or other instrument prohibit the siting of the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) within the Zone III.

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(l) No public water supply well or wellfield designed to pump 100,000 gallons per day or more approved after the effective date of 310 CMR 22.21 shall remain on-line following the amendment or repeal of a wellhead protection zoning or nonzoning control pertinent to that well or wellfield, or the expiration of any such period of years stated in a deed or other instrument approved pursuant to 310 CMR 22.21(1)(j) or 310 CMR 22.21(1)(k), unless the Department finds in writing that the supplier of water meets the requirements set forth in 310 CMR 22.21(1)(d) or 310 CMR 22.21(1)(e), whichever is applicable, or grants a variance in accordance with 310 CMR 22.21(5). Any source of supply removed from service shall be maintained by the supplier of water as an emergency source of water supply unless the Department finds in writing that the source is not needed by the supplier of water for present or future water supply.

(m) Notwithstanding any other regulatory provision to the contrary, the Department may exempt a supplier of water from any of the requirements set forth in 310 CMR 22.21(1)(d) while a state of water emergency declared pursuant to M.G.L. c. 21G, § 15, is in effect. In the event that the Department grants such an exemption, the well or wellfield shall remain on-line only for the duration of the state of water emergency, as determined by the Department.

(2) Wellhead Protection Zoning and Nonzoning Controls

(a) Wellhead protection zoning and nonzoning controls submitted to the Department in accordance with 310 CMR 22.21(1), shall collectively prohibit the siting of the following land uses within the Zone II, or Zone III if the criteria of 310 CMR 22.21(1)(f) have been met, of the proposed well or wellfield, whichever is applicable:

1. landfills and open dumps, as defined in 310 CMR 19.006;
2. landfills receiving only wastewater residuals and/or septage (wastewater residuals "monofills") approved by the Department pursuant to M.G.L. c. 21, § 26 through 53; M.G.L. c. 111, § 17; M.G.L. c. 83, §§ 6 and 7, and any regulations promulgated thereunder.
3. automobile graveyards and junkyard, as defined in M.G.L. c. 140B, § 1;
4. stockpiling and disposal of snow or ice removed from highways and streets located outside of Zone II that contains sodium chloride, chemically treated abrasives or other chemicals used for snow and ice removal;
5. petroleum, fuel oil and heating oil bulk stations and terminals, including, but not limited to, those listed under Standard Industrial Classification (SIC) Codes 5171 and 5983. SIC Codes are established by the U.S. Office of Management and Budget and may be determined by referring to the publication, Standard Industrial Classification Manual and any subsequent amendments thereto;
6. treatment or disposal works subject to 314 CMR 5.00 for wastewater other than sanitary sewage. This prohibition includes, but is not limited to, treatment or disposal works related to activities under the Standard Industrial Classification (SIC) Codes set forth in 310 CMR 15.004(6) (Title 5), except the following:
 - a. the replacement or repair of an existing system(s) that will not result in a design capacity greater than the design capacity of the existing system(s); and
 - b. treatment works approved by the Department designed for the treatment of contaminated ground or surface waters and operated in compliance with 314 CMR 5.05(3) or 5.05 (13); and
 - c. publicly owned treatment works, or POTWs.
7. facilities that generate, treat, store or dispose of hazardous waste that are subject to M.G.L. c. 21C and 310 CMR 30.000, except for the following:
 - a. very small quantity generators, as defined by 310 CMR 30.00;
 - b. household hazardous waste collection centers or events operated pursuant to 310 CMR 30.390;
 - c. waste oil retention facilities required by M.G.L. c. 21, § 52A; and
 - d. treatment works approved by the Department designed in accordance with 314 CMR 5.00 for the treatment of contaminated ground or surface waters.

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8. any floor drainage systems in existing facilities, in industrial or commercial process areas or hazardous material and/or hazardous waste storage areas, which discharge to the ground without a DEP permit or authorization. Any existing facility with such a drainage system shall be required to either seal the floor drain (in accordance with the state plumbing code, 248 CMR 2.00), connect the drain to a municipal sewer system (with all appropriate permits and pre-treatment), or connect the drain to a holding tank meeting the requirements of all appropriate DEP regulations and policies.
- (b) Wellhead protection zoning and nonzoning controls submitted to the Department in accordance with 310 CMR 22.21(1), shall collectively prohibit the siting of the following land uses within the Zone II, or Zone III if the criteria of 310 CMR 22.21(1)(f) have been met, of the proposed well or wellfield, whichever is applicable, unless designed in accordance with the performance standards specified below in 310 CMR 22.21(2)(b)1. through 7.:
1. storage of sludge and septage, as defined in 310 CMR 32.05, unless such storage is in compliance with 310 CMR 32.30 and 310 CMR 32.31;
 2. storage of sodium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;
 3. storage of commercial fertilizers, as defined in M.G.L. c. 128, § 64, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;
 4. storage of animal manures, unless such storage is covered or contained in accordance with the specifications of the Natural Resource Conservation Service;
 5. storage of liquid hazardous materials, as defined in M.G.L. c. 21E, and/or liquid petroleum products unless such storage is:
 - a. above ground level, and
 - b. on an impervious surface, and
 - c. either
 - (i) in container(s) or above-ground tank(s) within a building, or
 - (ii) outdoors in covered container(s) or above-ground tank(s) in an area that has a containment system designed and operated to hold either 10% of the total possible storage capacity of all containers, or 110% of the largest container's storage capacity, whichever is greater;

however, these storage requirements shall not apply to the replacement of existing tanks or systems for the keeping, dispensing or storing of gasoline provided the replacement is performed in a manner consistent with state and local requirements;
 6. the removal of soil, loam, sand, gravel or any other mineral substances within four feet of the historical high groundwater table elevation (as determined from monitoring wells and historical water table fluctuation data compiled by the United States Geological Survey), unless the substances removed are redeposited within 45 days of removal on site to achieve a final grading greater than four feet above the historical high water mark, and except for excavations for the construction of building foundations or the installation of utility works;
 7. and land uses that result in the rendering impervious of more than 15% or 2500 square feet of any lot, whichever is greater, unless a system for artificial recharge of precipitation is provided that will not result in the degradation of groundwater quality.
- (c) The proponent shall give written notice to the Department of any and all local by-laws, ordinances, rules and regulations that allow for the grant of a variance, waiver or exemption from any of the wellhead protection zoning or nonzoning controls submitted to the Department for approval in accordance with 310 CMR 22.21 before placing the proposed well or wellfield on-line.
- (d) The Department may require as part of the Source Approval process requirements of 310 CMR 22.21(1)(c), the completion of a nitrogen loading analysis for the new well's Zone II. A nitrogen loading analysis shall be required when, in the Department's judgement, the type and level of land use within the Zone II or other information reasonably indicates that nitrate concentrations in the well may or will exceed five mg/l nitrate.

22.21: continued

Public water systems required by their Water Management Act permits issued under 310 CMR 36.00 to define Zone IIs and implement land use controls shall be required to conduct a nitrate loading analysis as part of the Zone II delineation for wells that have exceeded five mg/l nitrate.

Public water systems whose required nitrate loading analysis predicts >five mg/l nitrate or whose well has exceeded five mg/l nitrate must prepare a nitrate management plan, subject to the Department's approval, which seeks to maintain nitrate levels below five mg/l for the subject well in the long-term.

(3) Requirements for all New and Existing Groundwater Sources

(a) Sources for Community Systems. Any person who obtains Department approval for a community public water system that relies entirely upon groundwater sources shall provide additional wells and pumping equipment, or the equivalent, capable of producing the same volumes and quality of water as the system's primary well or wellfield at all times, or shall provide the storage capacity equivalent to the demand of at least two average days if approved by the Department, unless an interconnection with another public water system has been provided which can adequately provide the quantity and quality of water needed water.

(b) Zone I. All suppliers of water shall acquire ownership or control of sufficient land around wells, infiltration galleries, springs and similar sources of ground water used as sources for drinking water to protect the water from contamination. This requirement shall generally be deemed to have been met if all land within Zone I is under the ownership or control of the supplier of water. Current and future land uses within the Zone I shall be limited to those land uses directly related to the provision of the public water system or to other land uses which the public water system has demonstrated have no significant impact on water quality. The Department may require greater distances or permit lesser distances than the Zone I distances set forth at 310 CMR 22.02, if the Department deems such action necessary or sufficient to protect public health.

(4) Inspection and Enforcement

(a) Each supplier of water shall annually survey the land uses within Zones I, II and III, or within the Interim Wellhead Protection Area, for each well and wellfield under its control.

(b) A supplier of water shall submit to the Department an annual report that identifies for each well and wellfield under its ownership and control the presence of new land uses within the Zones I, II and III, or within the Interim Wellhead Protection Area, that could adversely impact water quality. The annual reports shall be submitted on Department approved forms by January 31 for the preceding calendar year. The annual reports shall be submitted to the Department's Office of Water Supply at the Regional Office that serves the area where the well or wellfield is located.

(c) A supplier of water shall notify the local board of health or health department within 48 hours of detection of any violation of a statutory or regulatory requirement that may adversely effect its water supply or distribution system, and shall notify the inspector of buildings, building commissioners or local inspector, or the person charged with enforcement of local zoning and nonzoning controls, within 48 hours of detecting any violation of applicable land use restrictions that may adversely effect its water supply or distribution system. Such notices should include the following information:

1. the name of the person in violation;
2. the location where the violation is occurring;
3. the date when the violation was observed;
4. a description of the violation;
5. the legal citation of the requirement or restriction violated; and
6. a description of the actions necessary to remove or remedy the violation and the deadlines for taking such actions.

In addition, the supplier of water shall notify the Department's Office of Water Supply at the appropriate Regional Office upon giving any notice required by 310 CMR 22.21(4)(c).

(d) A supplier of water shall take appropriate action to determine whether the violation has been removed or remedied and shall notify the Department's Office of Water Supply at the appropriate Regional Office upon finding that the violation has been removed or remedied.

22.21: continued

(5) Variances

(a) The Department may grant a variance from the requirements of 310 CMR 22.21(1)(e) to a proponent that, despite its best efforts, is unable to adopt one or more of the requirements set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) if the Department finds that strict compliance with such requirements would result in an undue hardship and would not serve to further the intent of 310 CMR 22.21.

(b) The Department shall consider the following factors in making the finding necessary to grant a variance pursuant to 310 CMR 22.21(5):

1. the reasonableness of available alternatives to the proposed well or wellfield;
2. the overall effectiveness of existing land use controls and other protective measures on the proposed well or wellfield and any other water supply sources used by the supplier of water;
3. the nature and extent of the risk of contamination to the proposed well or wellfield that would result from the granting of the variance; and
4. whether the variance is necessary to accommodate an overriding community, regional, state or national public interest.

These factors need not be weighed equally, nor must all of these factors be present for the Department to grant a variance. The presence of any single factor may be sufficient for the granting of a variance.

(c) A variance granted pursuant to 310 CMR 22.21(5) shall be conditioned on such monitoring or other requirements as the Department may prescribe.

(d) Requests for variances shall be made in writing and clearly state the provision or requirement from which the variance is sought and the reasons and facts that support the granting of a variance, and shall include an evaluation of the reasonableness of alternatives to the proposed well or wellfield.

(e) Within 14 days of filing a request for variance under 310 CMR 22.21(5)(a), the person filing the request shall notify persons served by the supplier of water by direct mail and by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. The notice shall include:

1. the provision or requirements from which the variance is being sought;
2. the identity of the proponent of the well or wellfield;
3. the identity of the person requesting the variance, the address where a copy of the request for variance will be available for public inspection, and the times it will be available; and
4. a statement that the Department will receive written comments concerning the request from the public for a 30 day period commencing on the last date of newspaper publication.

(f) Each person submitting a request for variance shall submit to the Department a copy of the public notice required by 310 CMR 22.21(5)(e) and affidavits attesting to the fact that the notices have been given. The Department will receive written comments concerning the request from the public for a 30 day period commencing on the last date of newspaper publication.

(g) Within 30 days of the close of the comment period, each person requesting a variance under 310 CMR 22.21(5)(a) shall respond in writing to all reasonable public comments received by the Department.

(h) The Department may schedule a public hearing on any request for variance submitted in accordance with 310 CMR 22.21(5) if it determines on the basis of the public comments received that such a hearing is in the public interest. In the event that the Department schedules a hearing, the person filing the request shall notify persons served by the supplier of water of the hearing by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. In addition, the person filing the request shall notify each person who submitted written comment concerning the request to the Department by direct mail. The person filing the request shall submit to the Department a copy of the public notices required by 310 CMR 22.21(5)(h), and an affidavit attesting to the fact that the notices have been given, prior to the hearing. Persons filing a request for a variance under 310 CMR 22.21(5) shall pay the full the cost of all notifications and public hearing scheduled.

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- (i) Within 30 days of the grant of a variance under 310 CMR 22.21(5), any person that receives a variance shall notify persons served by the supplier of water of the granting of the variance, including any conditions imposed by the Department, by direct mail and by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. The person that receives the variance shall submit to the Department a copy of the public notices and an affidavit attesting to the fact that the notices have been given upon completion of the public notification.

22.22: Cross Connections Distribution System Protection

- (1) Purpose. The Department's purpose in establishing a comprehensive distribution protection program is to prevent the contamination of drinking water to the last free flowing outlets or consumer's tap. For this reason, the Department strongly advocates the elimination of all cross connections. The installation of backflow prevention devices does not eliminate a cross connection. The installation of backflow prevention devices is a solution when re-plumbing or repiping is not feasible. All cross connection protection devices shall be approved and permitted in accordance with 310 CMR 22.22. As set forth at 310 CMR 22.22(5) and 310 CMR 22.22(8)(b), each owner of such device shall apply for and be issued a permit by the Department.

- (2) Maintenance of a Cross Connection

- (a) No physical cross connection shall be maintained between the distribution system of a public water system, the water of which is being used for drinking, domestic, or culinary purposes, and the distribution system of any water source not approved by the Department as being of safe sanitary quality, unless said connection has been approved by the Department and a permit has been issued by the Department in accordance with 310 CMR 22.22.

- (b) Subject to applicable laws and regulations, public water systems shall have the authority to terminate any water service connection to any facility where cross connections are found to be in non-compliance with 310 CMR 22.22. The supplier shall deny water service to any premises where cross connections exist until corrective action is taken. If necessary, water service shall be disconnected for failure to test or maintain backflow prevention devices in a manner acceptable to the supplier. If it is found that the backflow prevention device has been removed or by-passed or otherwise rendered ineffective, water service shall be discontinued unless corrections are made immediately.

- (c) The public water system shall establish a time for completion of necessary corrections or removal of actual or potential cross connections, taking into consideration the degree of hazard involved and the time required to obtain and to install the needed equipment. The public water system shall use every means at its disposal to obtain voluntary compliance. However, if proper protection has not been provided after a reasonable period of time (following legal notification and subject to applicable laws and regulations), the public water system shall physically separate the public water supply from the on-site piping system in such a manner that the two systems cannot again be connected by an unauthorized person.

- (3) Public Water System Responsibilities. Every public water system shall be responsible for:

- (a) The quality of water delivered to its consumers to the last free flowing outlet and for the safety of the public water system under its jurisdiction.

- (b) Having a cross connection control distribution system protection program plan (the "cross connection program plan") approved by the Department as specified at 310 CMR 22.22(3)(b).

- 1. Every public water system is required to submit a cross connection program plan to the Department for review and approval in accordance with the following schedule:

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Population Served:	Submission Date
greater than 75,000	- June 1st 1988
50,001 - 75,000	- Dec 1st 1988
25,001 - 50,000	- June 1st 1989
10,001 - 25,000	- June 1st 1990
5,001 - 10,000	- June 1st 1991
3,301 - 5,000	- Dec 1st 1991
2,501 - 3,300	- June 1st 1992
1,001 - 2,500	- Dec 1st 1992
501 - 1,000	- June 1st 1993
101 - 500	- Dec 1st 1993
Less than 101	- June 1st 1994

2. Each plan must be prepared in accordance with departmental guidance and shall include, at a minimum, the following information: description of current program (i.e. staffing, tracking, surveying, testing, training and fee requirements) and evaluation of the current program, proposed changes and implementation plans. The plan shall also include an explanation of how the public water system will satisfy 310 CMR 22.22(3)(c) through (t).

3. The plan shall be fully implemented and operational by January 1, 1999. A public water system may use a contractor, subcontractor, or consultant to assist in the program implementation except as specified at 310 CMR 22.22(4)(b)1. However, every public water system shall continue to be responsible for compliance with 310 CMR 22.22 and subject to enforcement by the Department.

(c) Inspecting and surveying all industrial, commercial, and institutional premises served by the public water system to determine if cross connections exist and that all cross connections are properly protected by an appropriate device or eliminated.

(d) Maintaining on the public water system premises the following documentation:

1. a schedule of all facilities inspected and surveyed;
2. records of all device locations;
3. related correspondence, including notices of violation; and
4. list of devices and inspections of approved backflow prevention devices.

(e) Ensuring that all inspections and surveys for cross connections are conducted by a person who is certified by the Department as a Cross Connection Control Surveyor.

(f) Establishing and maintaining a cross connection control educational program for residential users.

(g) Not allowing any cross connection at any point within its system unless said cross connection is approved pursuant to 310 CMR 22.22.

(h) Ensuring that all cross connection protection devices are inspected and tested in accordance with the public water system program plan as approved by the Department and as specified at 310 CMR 22.22(14). The public water system has the option of testing the devices itself, having the device tested by the device owner, or having the testing conducted by a contractor.

(i) Establishing an audit program for devices not tested by public water system staff.

(j) Report to the Department annually by May 1st on a form specified by the Department. At a minimum the report shall include the following:

- a. a list of devices, approved and unapproved;
- b. the numbers and types of facilities surveyed yearly;
- c. the number type and location of violations found; and
- d. the number of new devices installed and the number of existing devices that were removed or replaced;

(k) Assisting Department personnel in any cross connection related inspections and backflow device installations:

(l) Taking appropriate action to eliminate cross connections and hazardous conditions, strongly promote compliance, and take the appropriate enforcement action when necessary:

(m) Notifying the device owner of any violations of said regulations by sending a Notice of Violation to owner;

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- (n) Notifying all device owners of their responsibilities relative to cross connections, by annually notifying device owners in writing of the program requirements and by holding an annual informational workshop for all device owners and consumers of water, unless waived in writing by the Department.
 - (o) Annually notify local public officials of the requirements of the distribution system cross connection control program, including Mayors, Town Managers, city and town councilors or selectmen, water commissioners, fire chiefs, local boards of health, plumbing inspectors, building inspectors, local state representatives, unless waived in writing by the Department.
 - (p) Attending the Department's annual distribution system cross connection control program training workshop, unless waived in writing by the Department.
 - (q) Generating all necessary correspondence relative to the administration and operations of the cross connection control program. The public water system will be responsible for all correspondence to device owners. All correspondence relating to the cross connection control program must be signed by the public water system. Whenever possible, the public water system must use the Department's standard correspondence forms. Modifications to Department's forms must be approved by the Department in writing.
 - (r) Reviewing and approving design data sheets and plans for proposed new installations of reduced pressure backflow preventers, double check valve assemblies, and air gap separations with tank and pump arrangements, effective January 1, 1999. The public water system may not delegate, or subdelegate, contract, or subcontract this responsibility to any other entity, unless otherwise authorized in writing by the Department.
 - (s) Ensuring, upon completion of installation that backflow prevention devices are installed according to the approved design data sheet and plans and tested for proper operation, effective January 1, 1999.
 - (t) Assigning a cross connection identification number provided by the Department. Initial inspection is necessary for proper device registration and permitting.
- (4) Delegated Public Water System Responsibilities.
- (a) A public water system desiring to be authorized by the Department to function as the Department's Designee shall meet the requirements of 310 CMR 22.22(3) and shall have its plan approved by the Department and be fully implemented and operational before delegation is granted as specified at 310 CMR 22.22(4).
 - (b) The delegated public water system shall:
 - 1. review and approve design data sheets and plans for proposed new installations of reduced pressure backflow preventers, double check valve assemblies, and air gap separations with tank and pump arrangements. The public water system may not delegate, or subdelegate, contract, or subcontract this responsibility to any other entity unless approved by the Department in writing. Effective January 1, 1999 all delegated public water systems, shall have a person on staff who is a certified cross connection surveyor.
 - 2. be responsible, upon completion of installation, to ensure that backflow prevention devices are installed according to the approved design data sheet and plans. The device shall be tested for proper operation.
 - (c) Public water system which have a cross connection program approved by the Department as of December 31, 1996 may operate under the conditions of their approved program as specified by 310 CMR 22.22 until January 1, 1999.
- (5) Owners' Responsibilities. The owner of any cross connection protection device shall:
- (a) Apply for, obtain and comply with all necessary approvals and permits from the public water system and/or the Department for the maintenance of cross connections, as specified at 310 CMR 22.22, including the permit issued by the Department for each cross connection protection device;
 - (b) Have suitable arrangements made so that inspections can be made during regular business hours;
 - (c) Maintain a spare parts kit and any special tools required for the removal and reassembly of devices;
 - (d) Provide the necessary labor for inspection and testing by the Certified Backflow Prevention Device Testers;

22.22: continued

- (e) Overhaul, repair, or replace within 14 days of the initial inspection date and retest pursuant to 310 CMR 22.22(14)(f), any device which fails a test or is found defective;
 - (f) Submit copies of the Inspection and Maintenance Report Form as required by the public water system.
 - (g) Maintain on the premises complete records on all devices for the life of said devices including as-built plans and design data sheets; maintain for seven years the Inspection and Maintenance Report Forms for tests conducted by the certified.
 - (h) Make certain that the cross connection protection device is tested as specified at 310 CMR 22.22(14) or as required by the public water system.
- (6) Certified Backflow Prevention Device Tester's Responsibilities. Certified Backflow Prevention Device Testers have the following responsibilities relative to cross connections:
- (a) Having a backflow preventer test kit that is maintained in proper working order and calibrated annually;
 - (b) Recording on forms designated by the Department, the test results for each inspection conducted;
 - (c) Submitting copies of inspection reports to the water supplier, and the owner within 30 days of the inspection; and
 - (d) Maintaining records of all test results for a minimum of seven years.
- (7) Local Plumbing Inspector Responsibilities. Local Plumbing Inspectors, authorized by M.G.L. c. 142 to administer and to enforce 248 CMR (the State Plumbing Code), have the following responsibilities relative to cross connections:
- (a) As required by 248 CMR 2.14(6), the Plumbing Inspector will ensure that potable water supply systems are designed, installed and maintained in a manner as to prevent contamination from non-potable liquids, solids or gases which may be introduced to a potable water supply system through cross connections;
 - (b) After reviewing the plans and specifications for plumbing work under 248 CMR 2.04(5), and before issuing a permit, the Plumbing Inspector, as required by 248 CMR 2.14, shall require the installation of appropriate devices in accordance with 310 CMR 22.00;
- (8) Approval And Permit Required.
- (a) Installation Approval.
 1. No person shall install or remove or contract with another person for the installation or removal of any reduced pressure backflow preventer or double check valve assembly required by 310 CMR 22.22 unless a design data sheet with plans showing the method of protection of the public water distribution system has been approved by the Department, its Designee or the public water system for the installation of such device.
 2. All persons shall obtain approval from the local plumbing inspector or the head of the local fire department, to the extent required by the State Plumbing Code, 248 CMR 2.04(3), or M.G.L. c.148, §27A, for the initial installation or retrofit for any change in the installation of any air gap separation with tank and pump arrangement, reduced pressure backflow preventer, or double check valve assembly.
 3. Prior to the installation of any pressure or atmospheric vacuum breaker, backflow preventer with intermediate atmospheric vent, or barometric loop, the plans and specifications for the plumbing work must receive a permit issued pursuant to 248 CMR 2.04(3) by the local Plumbing Inspector. For these devices, a plumbing permit issued under 248 CMR 2.04(3) shall constitute installation approval pursuant to 310 CMR 22.22.
 4. All design data sheets and plans for the installation of backflow prevention devices shall be reviewed by a certified cross connection surveyor as of December 31, 1998.
 - (b) Permit Requirement.
 1. Any person owning an approved cross connection protection device shall apply for and obtain a permit by the Department for each reduced pressure backflow preventer and double check valve assembly installed on the premises and shall pay an annual permit fee to the Department pursuant to 310 CMR 4.00. Departments of the Commonwealth and owners of cross connection protection devices located in delegated public water systems as specified at 310 CMR 22.22(4) shall be exempt from payment of the Department's annual permit fee.

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2. The Department reserves the right to revoke or suspend any conditional approval and/or permit for cause.

(c) The Department may revoke any approval or permit for any installation or change in installation of any backflow prevention device which is found to be in noncompliance with 310 CMR 22.22.

(9) Location of Devices.

(a) The location of each approved backflow prevention device, with respect to the plumbing on the premises and the service connection to the premises, shall be based upon the degree of existing or potentially existing health hazard, and shall conform to the following specific requirements:

1. Approved backflow prevention devices shall be located so that protection of all cross connections is achieved with a minimum number of devices;

2. Approved backflow prevention devices shall be located so as to provide in-plant protection;

3. The following types of facilities have been determined to present high health hazard conditions and in-plant protection shall be supplemented by installation of a reduced pressure backflow preventer or an air gap separation at the meter or property line unless otherwise specified by the Department or its Designee:

a. Nuclear reactors or other facilities where radioactive materials are used;

b. Sewage treatment plants and sewage pumping stations;

c. Piers, docks, marinas, shipyards;

d. Chemical plants;

e. Metal plating industries;

f. Hospitals, mortuaries, medical clinics, dental offices and clinics;

g. Laboratories, except when the Department or its Designee has made a specific determination that no health hazard exists on the premises;

h. Other types of facilities as determined in writing by the Department or its Designee.

(b) If, upon request by the owner of the premises or upon its own initiative, the Department or its Designee determines that it is unreasonable to locate all cross connections within the premises, or the Department or its Designee determines that protection of all cross connections is unreasonable for economic reasons, then (1) the public water supply distribution system shall be protected by installation of a reduced pressure backflow preventer or an air gap separation at the meter or property line, and (2) the owner of the premises shall provide a safe, alternative supply of potable water, well marked and labeled, to all domestic water fixtures on the premises.

(10) Types of Backflow Prevention Devices Required.

(a) Subject to the provisions of 310 CMR 22.22(10), Table 310 CMR 22-1 shall serve as the guide for the type of protection required.

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TABLE 22-1

AG - Air Gap

RPBP - Reduced Pressure Backflow Preventer

DCVA - Double Check Valve Assembly

AVB - Atmospheric Vacuum Breaker

BFPV - Backflow Preventer with Intermediate Atmospheric Vent

Types of Hazard on Premises	Acceptable Types of Backflow Preventers					Comments*
	AG	RPBP	DCVA	AVB	BFPV	
1. Sewage Treatment Plant	X	X				
2. Sewage Pumping Station	X	X				
3. Food Processing	X	X	X*			*If no health hazard exists
4. Laboratories	X	X	X*			*If no health hazard exists
5. Sinks with hose threads on inlets	X	X		X		
6. Hospitals, Mortuaries, Clinics	X	X				
7. Plating Facilities	X	X				
8. Irrigation Systems**	X	X		X*		Each case should be evaluated individually *If no back pressure is possible **Pressure Vacuum Breakers can be installed if no health hazard exists and back pressure is not possible
9. Systems or Equipment Using Radioactive Material	X	X				
10. Submerged Inlets	X	X		X*		If no health hazard exists and no back pressure is possible
11. Dockside Facilities	X	X				
12. Valved outlets or fixtures with hose attachments	X	X	X*	X**		Each case should be evaluated individually *If no health hazard exists **If no health hazard exists and no back pressure is possible
13. Commercial Laundries and Dry Cleaners	X	X				
14. Commercial Dishwashing Machines	X	X		X*		If no health hazard exists
15. High and Low Pressure Boilers	X	X				If chemicals are added
16. Low Pressure Heating Boilers					X	Residential and small commercial, having no chemicals added
17. Photo Processing Equipment	X	X				
18. Reservoirs -Cooling Tower Recirculating Systems	X	X				
19. Fire Protection Systems						
a. Any system with a pumper connection within 1700 feet of an unapproved supply available and accessible for fire dept use, unless otherwise indicated in writing by the local fire dept (s) pre-fire plan of the facility	X	X	X			
b. Any system with a pumper connection serviced by a fire dept (s) that use(s) or does not specifically prohibit, in accordance with DEP policies and guide-lines, the use of corrosion inhibitors or chemical additives in the tanks of their fire trucks, or where the water purveyor, based on a written statement from the local fire dept.(s), cannot be assured of the potability of the input to the pumper connection	X	X	X			
c. Any system with a pumper connection that normally requires the use of chemical extinguishing agents, unless otherwise indicated in writing by the fire department(s)	X	X				
d. Any system maintained at a facility with unusually complex piping systems, unless otherwise indicated in writing by the fire department(s)	X	X				
e. Any system which incorporates storage tanks or fire pumps taking suction from covered tanks or reservoirs	X	X				
f. Any system incorporating connections to chemical extinguishing agents, antifreeze, or auxiliary water suppliers	X	X				
20. Solar Energy Systems	X	X			X*	Residential and small commercial having no chemicals or only USP Glycenne added to water
21. Single Jacketed Heat Exchangers	X	X				Each case should be evaluated individually

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(b) Subject to the authority of the Department, its Designee, or public water system to issue the final determination of what type of device is required and the location of the device for each cross connection in individual cases, depending upon the degree of health hazard and type of backflow involved, the acceptable devices for backflow prevention include air gap separation, reduced pressure backflow preventers, double check valves assemblies, atmospheric or pressure vacuum breakers, backflow preventers with intermediate atmospheric vents, and barometric loops.

(c) There shall be no by-pass around any approved backflow prevention device unless the same type of approved backflow prevention device is installed on the by-pass.

(d) Fire Protection Systems.

1. Any new or existing fire system shall be evaluated by the Department, its Designee or public water system for a determination of the type of backflow prevention required. 310 CMR 22.22(10)(a) Table 22-1 shall serve as a guide for the protection required.

2. No person shall obstruct, shut off, remove, or destroy any part of any sprinkler system, water main, hydrant, or other device used for fire protection without first procuring a permit from the head of the local fire department, pursuant to M.G.L. c. 148, § 27A.

3. All existing cross connections between public water systems and fire protection systems, as described in Table 22-1, 310 CMR 22.22(10)(a)19.a. and b., and installed prior to March 21, 1997, are hereby conditionally approved and permitted by the Department, provided that: (a) the owner of such cross connection shall register the connection(s) with the Department or its Designee by December 31, 1997, unless an extension of time is granted by the Department or its Designee; and (b) the existing cross connection meets the requirements of 310 CMR 22.22(10)(a)19.a. or b. The owner's registration shall be documented on a form approved by the Department, a copy of which shall be retained by the public water system as specified at 310 CMR 22.22.

4. On or before December 31, 1999, the Department will determine whether it is necessary to install a protection device specified at 310 CMR 22.22(10)(a), Table 22-1, on an existing cross connection conditionally approved and permitted by the Department pursuant to 310 CMR 22.22(10)(d)3. In the event that the Department determines that it is necessary to install such a protection device, the owner of the cross connection shall:

a. submit design data sheets for the proposed protection device to the Department or its Designee for its written approval within 60 days from the date of the owner's receipt of the Department's written notification of its determination; and

b. install the protection device, as approved by the Department or its Designee, within 90 days from the date of the owner's receipt of the written approval of the protection device by the Department or its Designee.

5. Upon the installation of any such protective device, the owner of the cross connection shall comply with the annual permit and permit fee requirements at 310 CMR 22.22(8). Any owner of existing cross connection(s) conditionally approved and permitted by the Department pursuant to 310 CMR 22.22(10)(d)3, who decides to install a protection device specified at 310 CMR 22.22(10)(a), Table 22-1, when the Department has not determined that such a protection device is necessary, shall obtain the prior written approval of the Department or its Designee of the design data sheets for the proposed protection device.

6. Notwithstanding the provisions of 310 CMR 22.22(10)(d)3. and 4., by providing written notification to the owner of a cross connection between a public water system and a fire protection system, the Department or its Designee may, whenever the Department determines that the cross connection constitutes a threat to the public health, at any time require the installation of a protection device, modify or revoke the conditional approval of a cross connection, or require water quality monitoring.

(11) Approval of Devices for Use in Massachusetts.

(a) Types and models of atmospheric and pressure vacuum breakers and types and models of backflow preventers with intermediate atmospheric vent which may be used in Massachusetts for certain low hazard applications referred to in the State Plumbing Code shall be those meeting the requirements of, and approved by, the Board of State Examiners of Plumbers and Gas Fitters. Except as further restricted by the Department as provided in 310 CMR 22.22(5), all other backflow prevention devices meeting the requirements of, and

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approved by, the Board of State Examiners of Plumbers and Gas Fitters may be used in Massachusetts.

(b) Only types and models of reduced pressure backflow preventers, double check valve assemblies, and manufactured air gap separation devices which have been specifically evaluated and approved by the Department, and included on the list of approved backflow prevention devices maintained by the Department, may be used in cross connection control in Massachusetts.

(c) In order to be considered for inclusion on the list of approved backflow prevention devices, a manufacturer of the types of devices listed in 310 CMR 22.22(5)(b) must submit to the Department the following information:

1. A laboratory test report from an independent testing laboratory, based on American Society of Sanitary Engineering (ASSE) Standards No. 1015 and No. 1013, or American Water Works Association Standard C-506-78, or University of Southern California (U.S.C.) Specifications;
2. A report of a field test conducted for one year under supervision of an independent laboratory in conformance with University of Southern California Specifications or American Water Works Association Standard C-506-78;
3. A copy of ASSE Certification Seal and/or U.S.C. Certificate of Approval, if one or both has been given;
4. Current catalogs and specifications information, installation instructions, service and maintenance manuals;
5. Information on whether the bodies and internal parts of the mechanical device are constructed with corrosion resistant material acceptable and satisfactory to the Department; and
6. Information on whether the disc rings and the relief valve facing rings are of a synthetic rubber.

(d) Devices and valves installed on fire protection systems shall be listed by Underwriters Laboratory or approved by Factory Mutual Research in accordance with Appendix I of 780 CMR (the State Building Code), unless otherwise approved by the head of the local fire department.

(e) Any sizes and models of the types of devices listed in 310 CMR 22.22(5)(b) which have been evaluated, approved and listed for use in cross connection control in Massachusetts, but which are found after subsequent review to be defective or to have performed inadequately in the field, may be removed from the approved list by the Department.

(12) Installation Requirements.

(a) Reduced Pressure Backflow Preventers: Reduced pressure backflow preventers may be used to protect against backflow caused by back pressure or back siphonage and to protect a public water supply system from substances which are hazardous to health only when they are installed in the following manner:

1. For devices installed as in-plant protection, the reduced pressure backflow preventer shall be installed on the owner's side of the water meter on the potable water supply line.
2. Before installing a reduced pressure backflow preventer, all pipelines shall be thoroughly flushed to remove foreign material.
3. Drinking and domestic water lines, lines for safety showers, and lines for eye wash units must be taken off the upstream side of reduced pressure backflow preventers for devices installed as in-plant protection.
4. The reduced pressure backflow preventer shall be located so as to permit easy access and provide adequate and convenient space for maintenance, inspection, and testing.
5. The owner of the device shall be able to shut down water lines after reasonable notice during normal business hours to permit necessary testing and maintenance of the device, provided that if it is not possible to meet this requirement a by-pass line equipped with an approved type reduced pressure backflow preventer shall be installed.
6. The reduced pressure backflow preventer and shut-off valves must be installed in a horizontal alignment between three and four feet from the floor to the bottom of the device and a minimum of 12 inches from any wall, unless the device is approved by the Department for vertical installations.
7. Tightly closing valves must be installed at each end of the device and be immediately accessible unless otherwise approved by the Department or its Designee.

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8. The device must be protected from freezing, flooding, and mechanical damage.
 9. If the device is to be installed on a hot water line, a device approved for use at the elevated temperature must be used.
 10. If a drain is to be provided for the relief valve port, there must be an approved air gap separation between the port and drain line. To be approved, the air gap must be at least twice the internal diameter of the discharge line.
 11. Pit installation shall be approved only as provided in 310 CMR 22.22(12)(f).
 12. All water lines shall be color coded according to the state plumbing code, except that water filtration plants, pumping stations, sewage treatment plants and sewage pumping stations shall label all water lines in lieu of color coding.
- (b) Double Check Valve Assemblies: Double check valve assemblies may be used to protect against backflow caused by back pressure or back siphonage and to protect a public water supply system from substances which may be objectionable, but not hazardous to health, only if they are installed in the following manner:
1. Drinking and domestic water lines, lines for safety showers, and lines for eye wash units must be taken off the upstream side of the double check valve assembly for devices installed as in-plant protection.
 2. The double check valve assembly shall be installed with adequate space to facilitate maintenance, inspection, and testing.
 3. The double check valve must be installed horizontally and the top of the double check valve assembly must be between 30 inches and 53 inches from the floor to the bottom of the device and a minimum of 12 inches from any wall, unless otherwise approved by the Department or its Designee.
 4. If a water meter is not provided on the upstream side of an approved swing-type double check valve assembly, a three to five foot spacer must be installed between the check valves.
 5. Tightly closing valves must be installed at each end of the device and be immediately accessible unless otherwise approved by the Department or its Designee.
 6. Double check valve assemblies must be provided with suitable connections and appurtenances for testing.
 7. The device must be protected against flooding, freezing and mechanical damage.
 8. Pit installation will be approved only as provided in 310 CMR 22.22(12)(f).
- (c) Vacuum Breakers: Vacuum breakers shall not be used to protect against backflow due to back pressure and shall not be installed as protection for high hazard conditions as determined by the Department or its Designee. Vacuum breakers may be used for low health hazards only if they are installed in the following manner:
1. Vacuum breakers must be installed at least six inches above the flood level rim of the fixture they serve.
 2. Atmospheric vacuum breakers must be installed downstream of the last shut off servicing the fixture or equipment.
 3. Vacuum breakers must not be installed in locations where the device is subject to corrosive fumes, dust or grit.
 4. Vacuum breakers must be protected against flooding, freezing and mechanical damage.
 5. Atmospheric vacuum breakers shall not be used under conditions of static line pressure. Pressure vacuum breakers may be used under conditions of static line pressure.
- (d) Barometric Loops: Barometric Loops may be used only to protect against back siphonage, shall be approved for use only when no health hazard exists and when back pressure is not possible.
- (e) Air Gap Separation: Air gap separation may be used to protect against backflow caused by back pressure or back siphonage and to protect a public water supply system from substances which are hazardous to health and shall be approved for use only when installed in the following manner: the minimum air gap must be twice the diameter of the effective opening of the inlet pipe above the flood level rim of the receptacle being fed, but in no case shall it be less than one inch.
- (f) Pit Installation: No devices shall be installed in pits except as specifically approved by the Department, its Designee or public water system in cases of unique circumstances, and must comply with all OSHA standards where applicable for work in confined spaces then only as follows:

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1. the pit interior shall be a minimum of ten feet long, six feet wide, and must have a clear height 6½ feet high;
2. the pit must be watertight;
3. the pit opening and manhole cover must be at least 30 inches in diameter;
4. The foothold inserts must be of steel, aluminum, or other material approved by the Department, must be a maximum of 12 inches apart, and must be installed so that the top foothold is within 12 inches of the manhole cover and the bottom foothold is within 12 inches of the pit floor;
5. An adequate drain must be installed and the drain line shall not be connected to a sewer;
6. The pit floor shall be pitched to the drain;
7. If built in a roadway, the top of the pit must be adequately reinforced.

(13) Certification of Cross Connection Control Surveyors and Backflow Prevention Device Testers.

- (a) Any person desiring to be certified as a Backflow Prevention Device Tester or Cross Connection Control Surveyor in the Commonwealth of Massachusetts shall meet all of the following requirements:
 1. pass a written and practical certification examination which is approved by the Department for "Backflow Prevention Device Tester" or "Cross Connection Control Surveyor".
 2. apply to the Department for certification on the form provided by the Department. This submittal must include payment of the certification fee established by the Department.
- (b) Any person, upon satisfying the requirements of 310 CMR 22.22(13)(a), shall receive from the Department a certificate which indicates that he or she is a:
 1. Certified Backflow Prevention Device Tester; or
 2. Certified Cross Connection Surveyor; or
 3. Combination Certified Backflow Prevention Device Tester/Certified Cross Connection Surveyor.
- (c) All certificates will remain valid for three years from the date of issuance.
- (d) Any Certified Backflow Prevention Device Tester, Cross Connection Surveyor or person holding a valid Combination Certificate who desires to renew his or her certification must submit a renewal application including any renewal fee and prerequisites, no later than one month prior to the expiration date of his or her certificate.
- (e) All Certified Backflow Prevention Device Testers holding a valid certificate desiring to become a Certified Cross Connection Surveyor shall pass a written examination as stated at 310 CMR 22.22 (13)(a)1. Upon passing the examination, the Certified Tester will be issued a combination Certificate at no additional fee.

(14) Inspection Surveying, Testing and Overhauling of Devices.

- (a) All cross connection surveys and/or backflow prevention device tests shall be conducted by a person who is a Massachusetts Certified Cross Connection Surveyor. All backflow prevention device tests shall be conducted by a certified Backflow Prevention Device Tester in accordance with 310 CMR 22.22. A person holding a Combination Certification may conduct a cross connection survey and/or backflow prevention test.
- (b) Within 14 calendar days after the installation of devices in accordance with plans reviewed and approved by the reviewing authority, the owner or owner's agent shall notify the public water system to arrange for the inspection of the installation.
- (c) Reduced pressure backflow preventers, double check valve assemblies, pressure type vacuum breakers and air gap separations may be inspected and tested by the Department, its designee or the public water system at any time.
- (d) The public water system is responsible to ensure that each reduced pressure backflow preventer will be inspected semiannually in accordance with the public water system's approved cross connection program plan, as provided for in 310 CMR 22.22(3)(b). If the supply is used less than six months of the year, these devices shall be inspected and tested once each year. Each double check valve assembly shall be tested annually. Each test shall be conducted by a Certified Backflow Prevention Device Tester and recorded on the Department's Inspection and Maintenance Report Form. Copies of the inspection forms shall be submitted to the public water system and the owner.

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- (e) Devices which fail the test or are found to be defective shall be overhauled, repaired, or replaced and retested within 14 calendar days of the failure or from the discovery of the defect. The repair work must be done by a plumber licensed by the Commonwealth of Massachusetts to the extent required by 248 CMR 2.04(3). No person shall overhaul, repair, replace a device on a fire system without approval from the head of the local fire department pursuant to M.G.L. c.148, §27A.
- (f) No two routine tests for reduced pressure backflow preventers required by 310 CMR 22.22 shall be conducted within five months of each other without the written approval of the Department, its designee or the public water system.
- (g) The owner or owner's agent must maintain on the premises a spare parts kit and any special tools required for removal and reassembly of devices which are to be tested. The presence of these materials must be recorded on the Inspection and Maintenance Report Form.
- (h) The owner or owner's agent must provide labor on the premises as necessary to allow inspection and testing of devices by the Department, the supplier of water, or Certified Backflow Prevention Device Testers.
- (i) The owner or owner's agent shall notify the public water system in writing, no later than 30 days prior to the removal from service of any permitted device and such notification shall include the reason for removal and must indicate if the cross connection has been eliminated.
- (j) The owner or owner's agent shall notify the public water system in writing no later than 30 days prior to a change in ownership. Notification must include, at a minimum, the name and address of the new owner as well as documentation with proof of change in ownership.
- (k) If the public water system deems necessary, it may test a device more frequently to ensure proper cross connection control.

(15) Right of Entry. All owners or operators of commercial, industrial or institutional premises served by a public water supply system shall authorize agents and employees of the Commonwealth, upon presentation of their credentials, to enter their premises without a warrant for the purpose of inspecting and surveying their water systems for cross connections and assuring compliance with 310 CMR 22.22, whether or not the Commonwealth has evidence that the system is in violation of an applicable legal requirement.

(16) Fees.

- (a) The certification fees for Backflow Prevention Device Testers and Cross Connection Control Surveyors are established by the Department as stated in 310 CMR 4.00.
- (b) A person holding either a Testers or Surveyors certificate will not be charged an additional fee for a combination certification provided that all the requirements of 310 CMR 22.08 have been met.
- (c) Permit fees as specified at 310 CMR 22.22(8)(b) are established by the Department in accordance with 310 CMR 4.00.

(17) Enforcement.

- (a) Whoever maintains a cross connection without a permit, or after revocation of the permit to maintain such connection, and whoever maintains a cross connection without installing the appropriate backflow prevention device required by 310 CMR 22.22 and by the reviewing authority, shall be:
 - 1. punished by a fine of not more than \$25,000 for each day such violation occurs or continues, or by imprisonment for not more than one year, or both such fine and imprisonment, or
 - 2. subject to a civil penalty not to exceed \$25,000 per day for each day that such violation occurs or continues.
- (b) Any violation of 310 CMR 22.22 shall be subject to the administrative penalty provisions of 310 CMR 5.00.
- (c) Upon due notice to the person maintaining the connection the Department may revoke any permit whenever, in the opinion of the Department, the cross connection or the maintenance thereof no longer complies with 310 CMR 22.00.

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(d) After notice and opportunity for a hearing, the Department may suspend or revoke the certification of any Backflow Prevention Device Tester or Cross Connection Control Surveyor for cause. A certified backflow prevention device tester or certified cross connection control surveyor whose certification has been suspended or revoked by the Department may not test devices or conduct any surveys pending the outcome of the hearing, if any.

(e) Audit: The Department may perform audits of a Public Water System's distribution system protection cross connection control program to ascertain whether the PWS is in compliance with 310 CMR 22.22, and to ascertain the fitness and purity of the water for domestic use and to secure the sanitary protection of such waters, pursuant to M.G.L. c. 111, §160. The Department may issue a written order, pursuant to M.G.L. c. 111, § 160A, requiring a supplier of public water to perform any action necessary to assure the delivery of fit and pure water through its distribution system, including the actions required under 310 CMR 22.22(14).

(f) In order to ensure the delivery of a fit and pure water supply, the Department may issue a written order, pursuant to M.G.L. c. 111, § 160, requiring a supplier of public water to cease supplying water to any premises if one or more cross connections are maintained in violation of the requirements of 310 CMR 22.22, or requiring any person to take such actions as are reasonable and necessary to prevent or to eliminate cross connections.

22.23. Use of Non-Centralized Treatment Devices and Bottled Water

(1) Public water systems shall not use bottled water or point-of-use devices to achieve compliance with an MCL listed in 310 CMR 22.00. Bottled water or point-of-use devices may be approved by the Department for use on a temporary basis to avoid any unreasonable risk to health.

(2) Avoidance of Unreasonable Risk To Health: The Department may require a public water system to use bottled water, point-of-use devices, point-of-entry devices or other means as a condition of granting a variance or an exemption from the requirements of 310 CMR 22.06, 22.06B, 22.07A and 22.07B to avoid an unreasonable risk to health. The Department may require a public water system to use bottled water and point-of-use devices or other means, but not point of entry devices, as a condition for granting an exemption for corrosion control treatment required for lead and copper in 310 CMR 22.06B(2) and 22.06B(3) to avoid an unreasonable risk to health. The Department may require a public water system to use point-of-entry devices as a condition for granting an exemption from the source water treatment and lead service line replacement requirements for lead and copper under 310 CMR 22.06B(4) and 22.06B(5) to avoid an unreasonable risk to health.

(3) Bottled Water: Public water systems that use bottled water as a condition for receiving a variance or an exemption from the requirements of 310 CMR 22.07B(1) and 22.07A(1) and 22.06(2) must meet the requirements specified in either 310 CMR 22.23(3)(a) or 22.23(3)(b) and 310 CMR 22.23(3)(c):

(a) Monitoring Program: The Department will require and approve a monitoring program for bottled water. The public water system must develop and put in place a monitoring program that provides reasonable assurances that the bottled water meets all MCLs. The public water system must monitor a representative sample of the bottled water for all contaminants regulated under 310 CMR 22.07B(1) and 22.07A(1) and 22.06(2) during the first three-month period that it supplies the bottled water to the public, and annually thereafter. Results of the monitoring program shall be provided to the Department annually.

(b) Certification: The public water system must receive a certification from the bottled water company that the bottled water supplied has been taken from an "approved source" as defined in 21 CFR 129.3(a); the bottled water company has conducted monitoring in accordance with 21 CFR 129.80(g)(1) through (3); and the bottled water does not exceed any MCLs or quality limits as set out in 21 CFR 103.35, 110, and 129. The public water system shall provide the certification to the Department the first quarter after it supplies bottled water and annually thereafter. At the Department's option a public water system may satisfy the requirements of 310 CMR 22.23(3) if an approved monitoring program is already in place in another State.

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- (c) Responsibility: The public water system is fully responsible for the provision of sufficient quantities of bottled water to every person supplied by the public water system via door-to-door bottled water delivery.
- (4) POE or POU Devices: Public water systems that use point-of-use or point-of-entry devices as a condition for obtaining a variance or an exemption from NPDWRs must meet the following requirements:
 - (a) It is the responsibility of the public water system to operate and maintain the point-of-use and/or point-of-entry treatment system.
 - (b) Before point-of-use or point-of-entry devices are installed, the public water system must obtain the approval of a monitoring plan which ensures that the devices provide health protection equivalent to that provided by central water treatment.
 - (c) The public water system must apply effective technology under a Department approved plan. The microbiological safety of the water must be maintained at all times.
 - (d) The Department will require adequate certification of performance, field testing, and, if not included in the certification process, a rigorous engineering design review of the point-of-use and/or point-of-entry devices.
 - (e) The design and application of the point-of-use and/or point-of-entry devices must consider the potential for increasing concentrations of heterotrophic bacteria in water treated with activated carbon. It may be necessary to use frequent backwashing, post-contactor disinfection, and Heterotrophic Plate Count monitoring to ensure that the microbiological safety of the water is not compromised.
 - (f) The Department must be assured that buildings connected to the system have sufficient point-of-use or point-of-entry devices that are properly installed, maintained, and monitored such that all consumers will be protected.

22.24: Sale, Transfer of Property Interest, or Change in Use of Water Supply Land

- (1) No supplier of water may sell, lease, assign, or otherwise dispose of, or change the use of, any lands used for water supply purposes without the prior written approval of the Department. The Department will not approve any such disposition or change in use unless the supplier of water demonstrates to the Department's satisfaction that such action will have no significant adverse impact upon the supplier of water's present and future ability to provide continuous adequate service to consumers under routine and emergency operating conditions, including emergencies concerning the contamination of sources of supply, failure of the distribution system and shortage of supply.
- (2) Land Transfers Any sale, transfer of property interest or change in use of land acquired for water supply purposes may also require approval by a two-thirds vote of the Legislature, in addition to Department approval. (Massachusetts Constitution Amend. Art. XCVII, Section 243)
- (3) Easements The Department will not approve any grant of easement for pipelines, or other conduit, carrying liquid petroleum products within the Zone I of a PWS. For other public utility easements within Zone I, the Department may require as a condition of any grant of such easement an express perpetual prohibition on the use of fertilizers, pesticides, herbicides, and other non-mechanical means of vegetation control within the area subject to the easement.

22.25: Abandonment of Water Supply Sources

- (1) No supplier of water may remove a public water system source from service or abandon a public water system source without the prior written approval of the Department. The Department will not approve any such action unless the supplier of water demonstrates to the Department's satisfaction that such action will have no significant adverse impact upon the supplier of water's present and future ability to provide continuous adequate service to consumers under routine and emergency operating conditions, including emergencies concerning the contamination of sources of supply, failure of the distribution system and shortage of supply.

22.25: continued

(2) The supplier of water shall maintain each public water system source removed from service as an emergency source unless the Department approves its disposition in accordance with 310 CMR 22.24 or its abandonment in accordance with 310 CMR 22.25. All public water system groundwater sources approved for abandonment or permanent closure may continue to be used as non-public water system sources. The Department may require closure of certain groundwater sources in a manner that minimizes the potential for groundwater contamination and public health risk, by permanently preventing vertical movement of water within the borehole and annular space and eliminating all physical hazards at the ground surface associated with the well's construction or location. Proposals for permanent closure shall describe the closure method and materials to be used and shall be submitted to the Department for review and approval.

22.26: Severability

If any provision of 310 CMR 22.00 or its application to any unit of government is held invalid, such invalidity shall not affect other provisions or applications of 310 CMR 22.00 which can be given effect without the invalid provision or application and to this end the provisions of 310 CMR 22.00 are declared to be severable.

REGULATORY AUTHORITY

310 CMR 22.00: M.G.L. c. 111, § 160A.

IN THE

of the

County of

State of

do hereby certify that

the within and foregoing

is a true and correct

copy of the

as the same appears

from the records of

this office.

Witness my hand and

the seal of this office

this

day of

19

In The Main

1996 Special TNC Issue • Technical Assistance Newsletter for Massachusetts Drinking Water Suppliers

WELCOME to the first special issue of *In the Main* designed primarily for the owners and operators of transient noncommunity public water systems (TNCs). We hope you will find this publication helpful as you learn more about how to meet your responsibilities as a public drinking water supplier.

Although most TNCs are privately owned, they make up the largest group of water suppliers in Massachusetts. Approximately 70 percent fall into one of the following categories:

- ❖ Restaurants and bars
- ❖ Hotels, motels, inns, and cottages
- ❖ Summer camps and retreat centers
- ❖ Private campgrounds
- ❖ Recreational facilities
- ❖ State and federal parks and beaches
- ❖ Water bottlers and vendors.

The remaining 30 percent include clubs, churches, convenience stores, municipal buildings, and other nonresidential facilities that provide water from their own sources to the public.

DEP's Southeast Region has the greatest number of TNCs (368), followed by the Western Region (249), the Central Region (181), and the Northeast Region (75).



DEP Regional Offices

Western Regional Office, Springfield:
(413) 784-1100

Central Regional Office, Worcester:
(508) 792-7650

Northeast Regional Office, Woburn:
(617) 932-7600

Southeast Regional Office, Lakeville:
(508) 946-2760

Small Water Suppliers Important to Public Health

Yvette dePeiza, DEP Water Quality Assurance Manager

Restaurants, campgrounds, motels, summer camps, golf courses, and churches that provide water to the public from their own sources are among the 873 transient noncommunity public water systems in Massachusetts.

Known as "TNCs," these facilities supply drinking water to millions of residents, visitors, and tourists every year. For this reason, TNCs provide a vital service, and any deterioration in the quality of their water can have a significant impact on many consumers.

Protecting Water Quality

In Massachusetts, the federal Safe Drinking Water Act is administered by the state Department of Environmental Protection (DEP), with oversight from the U.S. Environmental Protection Agency.

To ensure that TNCs provide a safe supply of water to their customers, DEP uses the following approaches:

1. **TNC Registration.** The first step is for DEP to identify all TNCs in the state. This identification process requires a partnership with local boards of health, chambers of commerce, professional associations, and local building and planning agencies that have knowledge of or jurisdiction over local facilities.
2. **Monitoring Schedules.** Once a TNC has been identified and registered, the next step is to get the system onto a regular schedule for water quality monitoring. Compared with community

systems (which may test for more than 100 contaminants), TNCs have very limited requirements.

TNCs are required to test their



drinking water routinely for four important substances: coliform bacteria,

Continued on Page 8

In This Issue



- ❖ Source Protection for TNCs
- ❖ Certified Operator Requirements
- ❖ Bacteria and Nitrate Testing
- ❖ Money-Saving Tips

Bacteria Monitoring: The Most Critical Tests for Any Water Supplier

Claire Socher

All public water systems in Massachusetts must test their water for total coliform bacteria on a routine basis.

Total coliform bacteria is used as an indicator of possible drinking water contamination by fecal matter from humans, domestic animals, birds, or other wild animals.

Although coliform bacteria are not usually harmful to humans, they can indicate the presence of other disease-producing organisms.

The health impacts from these

disease-causing bacteria are usually brief but unpleasant and include symptoms such as diarrhea and nausea. Because symptoms can begin soon after a person drinks contaminated water, even TNCs are not exempt from bacteria monitoring.

A typical TNC that operates year-round, serving no more than 1,000 people and using only groundwater, must monitor for total coliform bacteria each calendar quarter.

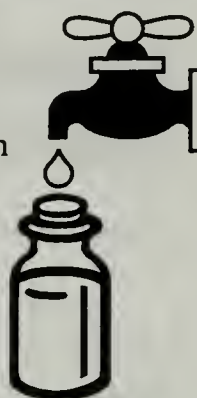
Seasonal establishments, such as camps, are required to test each source for coliform bacteria once a month during every month the facility is open.

The supplier collects samples at locations that are representative of water throughout the distribution system, according to a written sampling plan.

If the sample is found to be "coliform-positive," a set of repeat samples must be collected within 24 hours of being notified by the laboratory.

If you collect one sample per sampling period, you must collect at least four repeat samples at the following locations:

1. At the original sampling tap or faucet where the coliform-positive sample was taken.



2. Within five taps or faucets upstream from the original sampling site.
3. Within five taps or faucets downstream from the original sampling site.
4. Elsewhere in the distribution system.

It may be difficult for TNCs to identify four repeat sampling locations because of their small size. Therefore, we strongly encourage all TNCs to submit a sampling plan to their DEP regional office before a problem occurs.

If any repeat samples are positive, your system must notify DEP by the end of the next business day after learning of the positive result. Also, to protect your customers you must:

- ☐ Determine the cause of the contamination and correct it immediately.
- ☐ Continue to take repeat samples every 24 hours at the same four sites where the initial repeat samples were taken until one complete set of repeat samples is free of coliform.
- ☐ Notify your customers about the violation so they can take precautions to protect themselves against waterborne disease. You must provide notice by hand delivery or posting no later than 14 days after the violation.

If you have questions on how to collect your samples or interpret a bacteria result, please call your DEP regional office. ♦



In The Main

Massachusetts Department of
Environmental Protection
Division of Water Supply
One Winter Street
Boston, MA 02108

Commonwealth of
Massachusetts
William F. Weld, *Governor*
Argeo Paul Cellucci, *Lt. Governor*

Executive Office of
Environmental Affairs
Trudy Coxe, *Secretary*

Department of
Environmental Protection
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Division of Water Supply
David Y. Terry, *Director*
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Nitrate Testing Protects Children

Damon Guterman

Regular monitoring of your TNC public water supply is critical to assuring both you and your customers that the water they drink is safe.

Besides bacteriological testing, TNCs are required to routinely sample their drinking water for only three other contaminants: sodium, nitrate, and nitrite. TNCs do not have to perform a



wide range of tests for other chemicals because the people they serve do not drink the water every day.

Nitrate and nitrite are chemically related contaminants that can get into drinking water from septic systems

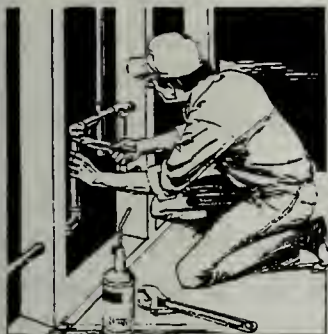
Continued on Page 7

How to Meet the Certified Operator Requirement

Darren Hersh

Is your water system operated by a state-certified drinking water supply operator? If the answer is "no," then please read on.

All public water systems in Massachusetts are required by 310 CMR 22.11B of the state Drinking Water Regulations to be managed by a person with a certificate of competency from the Board of Certification of Drinking Water Supply Facilities. This



includes very small systems (serving 500 people or fewer), water vending machines, and bulk or bottled water operations. DEP's goal is to have all TNCs in compliance with the certified operator requirement by July 1, 1997.

Certified operators are the most important resource for providing a safe supply of water to the public. They are trained in the workings of public water systems as well as the rapidly changing state and federal drinking water laws.

If your system is not being run by a certified operator at this time, there are two main ways to obtain one:

- ◆ you can hire a certified operator of your choice on a contract basis, or
- ◆ you or a staff person can become certified as a Very Small System (VSS) or Water Vending Machine (VND) operator by taking an examination and meeting certain education and experience requirements.

Examinations to become a certified operator are given by the National Assessment Institute (NAI) in April, July, and November. More than 80 percent of the people who

Continued on Page 6

NeRWA Provides a Helping Hand for Small Systems

John Lukin, Northeast Rural Water Association

"Circuit riding".... That's what the Northeast Rural Water Association (NeRWA) calls its traveling on-site assistance for small water systems.

Every day NeRWA circuit riders work with small system operators to detect leaks, locate pipes, fine-tune equipment, hunt down and fix contamination problems, explain rules and regulations, and take positive steps to protect sources. In short, NeRWA comes to you to help solve problems, and there's no charge for getting the help you need.

NeRWA receives grant dollars from the U.S. Environmental Protection Agency and the former Farmers Home Administration to provide on-site

assistance and training to operators of small public drinking water systems and wastewater treatment systems in Massachusetts, New Hampshire, and Vermont. We've been at it for 14 years.



Although NeRWA's circuit riders are usually on the road, they call the main office in Vermont daily to get messages from systems requesting assistance. The circuit rider for your area will then call you to make an appointment to visit your facility and help solve whatever problems you're facing.

So dial (802) 660-4988 and explain what you need. Shortly thereafter, one of our circuit riders will be at your door to lend a helping hand -- for only the price of the phone call. ♦

Sanitary Surveys Reduce Health Hazards



James Holeva

How do you know that your business, church, or office is providing the best quality drinking water to your consumers? One way to tell is through a sanitary survey.

Sanitary surveys for TNCs are presently conducted once every five years by DEP regional staff. In the future, more frequent surveys may also be conducted by Massachusetts-certified drinking water operators.

The basic objective of a sanitary survey is to collect information to determine whether a public water system is capable of continuously providing water that meets standards set by the Massachusetts Drinking Water Regulations (310 CMR 22.00).

A sanitary survey is actually an evaluation of your water system to locate and identify any health hazards that might exist. For example, you may have a structural defect in the water system that regularly or occasionally prevents satisfactory purification of the water supply or you may be storing substances near your well that could inadvertently pollute the water supply.

Sanitary surveys are conducted to benefit you as well as those who drink your water. Each survey involves a simple investigation of the source area, distribution system, monitoring history, and general operations such as recordkeeping.

Remember, DEP's sanitary survey staff are here to help you understand your role in providing good water. So when a surveyor visits your business or facility, he or she will be more than glad to answer any of your questions and to provide the necessary information to help you operate your system safely.



CONNECTION CORNER

CROSS

Every Cross Connection Needs Backflow Protection

Otavio DePaula-Santos

What is a cross connection?

A cross connection occurs whenever a drinking water line is directly or indirectly linked to a piece of equipment or piping containing nonpotable liquids, solids, or gases.

Why should I be concerned about cross connections?

An unprotected or inadequately protected cross connection in your facility or place of business could contaminate the drinking water you provide to your customers or your own family.

Contamination occurs when nonpotable water or liquid chemicals flow back into your drinking water lines.

Cross connection contamination may cause severe injuries, illness, and even death. Unprotected or inadequately protected cross connections have been known to cause outbreaks of hepatitis A, gastroenteritis, Legionnaire's disease, chemical poisoning, body lesions, damage to plumbing fixtures, and explosions.

What causes the contamination?

Backpressure occurs when the pressure in a piece of equipment such as a boiler, dishwasher, irrigation system, or central air conditioning unit is greater than the pressure inside the drinking water line.

Backflow (also known as back-siphonage) occurs when the pressure in the drinking water line drops in response to events such as water line breaks.

When this happens, contaminants can be sucked into the drinking water line if backflow devices have not been installed or are not functioning properly.

What types of cross connections could I encounter in my system?

Many people are surprised to learn that the outside water spigot and the garden hose tend to be the most common sources of cross connections.

A garden hose creates a hazard when submerged in non-drinking water, such as a swimming pool, or when attached to a chemical sprayer for weed-killing or fertilizing. Garden hoses are also often left laying on the ground and may be contaminated by garden chemicals or cesspools.

Other potential sources are central air conditioning or cooling systems, fire protection systems, lawn irrigation systems, high-pressure boilers, and process equipment such as chemical mixing tanks, plating tanks, and heat exchangers.

How is drinking water protected from cross connections?

The best way to protect drinking water is to *eliminate every cross connection*. When this is not possible, the drinking water lines should be protected by backflow preventers.

Who is responsible?

Federal and state laws require public water suppliers to protect their water systems from contamination or pollution caused by cross connections.

Water suppliers should make sure that every cross connection is eliminated or properly protected by a backflow preventer. It is also the water supplier's responsibility to ensure that each backflow preventer is tested and in working order.

Local health officials and licensed

plumbers are responsible for protecting public health by making sure that unprotected cross connections do not occur.

What can I do to make sure my drinking water system is protected from cross connections?

☞ Have your system surveyed to make sure all cross connections have been eliminated or properly protected. The inspection should be conducted by a certified cross connection surveyor.

☞ Have a licensed plumber make all needed changes to the plumbing system.

☞ Install hose bibb vacuum breakers on all outside faucets. The vacuum breakers isolate garden hose applications, protecting drinking water from contaminants.

☞ Educate your staff about the potential health risks caused by cross connections.

For more information on cross connections, contact your local plumbing inspector or your local health official.

You may also contact DEP's Division of Water Supply at One Winter Street, 9th Floor, Boston, MA 02108 or call Otavio DePaula-Santos at (617) 556-1085. ♦

Money-Saving Tips for Small Systems

George Zoto



To help ease the financial pressure of complying with the Safe Drinking Water Act, owners of very small systems are encouraged to consider the following cost-cutting strategies:

- ☐ Shop around for a board-certified operator. You may be able to hire one for less money than you are now paying.
- ☐ Form a cooperative with other TNCs to use group buying power to contract for lab and certified operator services.
- ☐ Become your own certified operator.
- ☐ Composite your monitoring samples with those from neighboring public water systems to reduce water testing costs. ♦

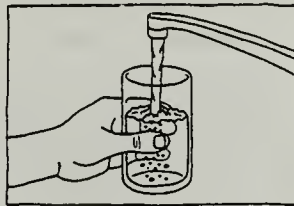
Source Protection for TNCs

Nancy Baker

What have you done lately to protect your drinking water supply? If you had to stop and think about the answer, you may need to put source protection a little higher on your "things to do" list.

Owners of small water systems can do many things to protect their water sources from contamination. As a water provider you should:

- ◆ Know what to protect and learn where the protection area is located.
- ◆ Recognize potential threats to the water supply.
- ◆ Develop an action plan to eliminate or reduce any threats and to maintain high-quality drinking water.



For a small public water system, the Zone I is the primary protection area. The Zone I is a circular area of land around a public supply well that is defined by its radius, which ranges from 100 to 400 feet, depending on the approved yield of the well.

Control of the Zone I, by ownership or conservation restriction, is necessary so

Continued on Page 7

Littleton Water Department Provides Consultant Services

Alan H. Cathcart, Littleton Water Department

In an effort to help nearby very small water systems stay in compliance with state and federal drinking water regulations, the Littleton Water Department has set up a Management Services Program that can assist them with everything from water sampling to annual statistical reporting.

Before this program was established, the Littleton Water Department periodically received requests for help from

neighboring very small systems. While our department is staffed to handle a full range of water supply and distribution-related issues, most of our outside requests

involved explanation of state and federal drinking water regulations.

As demand increased, the time involved in outside consulting and management services warranted financial compensation. The Littleton Water

Department has now developed agreements with eight very small water systems. The services we offer include:

- Routine inspections by state-certified water supply operators.
- Cross connection surveys and backflow testing.
- Annual statistical reporting.
- Water quality sampling and reporting.
- Wellhead protection assistance.
- Environmental audit services.
- Distribution oversight, including underground leak detection surveys, meter testing, and general distribution analyses.

Although we must charge for our services to justify our involvement, we believe that our expertise and in-house resources are invaluable to these systems.

Note: Large community water suppliers or contract certified operators in your area may offer similar services. For further information, call DEP at (617) 292-5966. ◆



DEP Focuses on Registration of "New" Systems

Jane Ceraso

As an important step to protect public health, the Division of Water Supply has redoubled its efforts to register previously unregistered public water supplies (PWSs) and bring them into compliance with the Massachusetts Drinking Water Regulations.

In the first eight months of 1996 alone, DWS identified and registered 68 restaurants, schools, inns, water vending machines, and other facilities that supply drinking water from their own sources to an average of at least 25 people a day for at least 60 days of the year. Fifty-three of these "new" PWSs are classified as transient noncommunity systems.

DEP's regional offices will continue to work closely with local boards of health to identify public water supplies that remain unregistered. Our goal is to ensure that no public water supplies are operating in Massachusetts without the necessary oversight.

If you know of any businesses or municipal buildings that may need to be registered, please contact your DEP regional office (*see page 1*). ◆

Free Publications for Small Systems



Massachusetts Directory of Small Noncommunity and Community Systems: A Directory for Networking, 1996.

Drinking Water Requirements of Transient Noncommunity Systems, 1996.

Wellhead Protection Tips for Small Public Water Systems, 1996.

Cross Connections: A Guide for Massachusetts Restaurant Owners, 1994.

Small Public Water Systems: Money Saving Tips, 1996

To order copies of these and other free publications, call (617) 292-5770.

Enforcing the Drinking Water Regulations for TNC Systems

Yvette dePeiza

Transient noncommunity water systems (TNCs) provide drinking water to millions of Massachusetts residents and visitors each year. As such, the quality of their water is extremely important and DEP's Division of Water Supply (DWS) must use a variety of tools to ensure compliance with state and federal drinking water standards.

The first tools used are always notification of responsibility, education, and training. Many TNCs may not be aware of their responsibilities as public water systems, so using notification as a first step is very helpful to the TNCs.

Notification is accomplished through correspondence, training seminars, newsletters, registration promotions, site visits, and cooperation with local partners such as boards of health (BOHs). This has resulted in the identification of many unregistered TNCs, as well as increased compliance.

For TNCs that do not respond to the first steps, DWS will begin a process that starts with pre-enforcement notification in the form of a letter, postcard, phone call, or referral to a trade association.

When pre-enforcement is unsuccessful, DWS proceeds to full enforcement, which begins with a notice of noncompliance (NON). NONs are very serious and allow DWS to escalate its enforcement actions. Penalties of up to \$25,000 per day can be assessed against TNCs, depending on the severity of the violation. DWS can also refer cases to the Massachusetts Attorney General's Office or to the U.S. Environmental Protection Agency for enforcement follow-up.

DWS is currently piloting another compliance tool for TNCs. Under the pilot project, DWS refers noncomplying TNCs to the Massachusetts Department of Public Health (DPH) and the local BOH. The BOH then issues an Order of Correction (OC) to the TNC for not having an acceptable supply of water.

The BOH can revoke the TNC's

license if the problem is not corrected. This enforcement tool is very valuable as a deterrent because TNCs such as restaurants and motels risk having to close their businesses for failure to comply with the drinking water requirements.

DWS is also developing a tool that will use the potential of public exposure to keep TNCs in compliance. DWS plans to provide a list of all noncompliers to local agencies and newspapers. This type of approach has been successful in other areas (for example, in dealing with tax delinquents), and DEP expects it will lead to an increase in compliance.

Despite all the tools available, DWS strongly prefers to gain compliance from water suppliers without having to resort to enforcement actions. To this end, DWS will continue to use education and training as the primary tools for bringing TNCs into compliance with the state and federal drinking water rules.

TNC owners should be aware, however, that DEP is prepared to use any and all enforcement tools to ensure that their customers receive a safe supply of water. ♦



■ Operators, continued from page 3
take the VSS exam pass it. The fee to register for the exam is \$60.

After passing the examination, you must apply to the Board for certification. There is a one-time application fee of \$10 and a certification renewal fee of \$15 every two years.

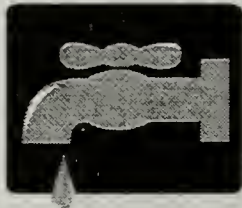
Certified operators must maintain their level of competency and knowledge of the regulations through continuing education. Operators are required to earn five training contact hours (TCHs) each renewal period.

For information on exam preparation courses and continuing education, please call (617) 292-5966 or (617) 292-5910. For an application to take the operator certification examination, contact NAI at (508) 624-0826.

If you choose to hire an operator, you can obtain a list of state-certified operators by calling the State House Bookstore at (617) 727-2834 and requesting a copy of the *Directory of Public Water System Certified Operators for Contract Services*.

In the meantime, you must apply for Temporary Emergency Certification to keep your system in compliance. This certificate will allow you to designate a person to operate your system for six months while you become certified or hire a certified operator.

To obtain an application for temporary certification, please contact Darren Hersh at (617) 292-5910. ♦



NEW... Special TNC Guide to the Massachusetts Drinking Water Regulations

DEP has prepared a new comprehensive guide to give owners and operators of transient noncommunity water systems a better understanding of their requirements under the current state policies and regulations.

Designed in an easy-to-read format, the guide explains the basic requirements for managing a TNC and includes a general checklist of responsibilities. Among the many topics covered are water quality testing and reporting, replacement of wells, treatment devices, system improvements, estimated annual costs, reclassification, and an excerpt from the state Drinking Water Regulations for TNCs.

The guide will be sent to all Massachusetts TNC owners and operators in November. Please keep your copy at your fingertips for regular reference and updating.

■ **Nitrates**, *continued from page 2*
(human wastes) and from agricultural and lawn care products (fertilizers and animal manure). Whether one or both contaminants are found depends on the soil and water conditions.

In infants, high levels of nitrate may interfere with the blood's ability to carry oxygen. This condition is called "blue baby syndrome" or methemoglobinemia.

Infants drinking water with elevated nitrate levels can become ill or even die after only a few days of exposure. Nitrate is also suspected of being harmful to adults, but studies to date have been inconclusive.

All public water systems, including TNCs, must test for nitrate a minimum of once every year. Naturally occurring nitrate levels vary but are generally below 3 milligrams per liter (mg/L). If any result exceeds 5 mg/L, then testing must be done once every three months. The federal guideline for the highest allowable level of nitrate in drinking water (called the maximum contaminant level or MCL) is 10 mg/L.

All public water systems must test for nitrite once every three years, usually at the same time as that year's nitrate test. If the nitrite result exceeds 0.5 mg/L, quarterly testing will be required. The MCL for nitrite is 1.0 mg/L.

If the nitrate levels in your drinking water supply have been increasing steadily over the past few years and are approaching 5.0 mg/L, you should raise this issue during a sanitary survey to receive assistance in examining the possible causes. ♦

Toll-Free Technical Assistance for Small Public Water Systems

American Water Works Association,
Small System Operational Support:
1-800-366-0107

National Drinking Water Clearinghouse:
1-800-624-8301

Safe Drinking Water Hotline (EPA):
1-800-426-4791

Water Vending and Bottling Requirements in Massachusetts

Frank Niles

Water vending machines, in-state bottled water operations, and companies that supply bulk water for drinking are special types of TNCs that are regulated jointly by DEP and the Massachusetts Department of Public Health (DPH).

Bottled water is regulated primarily by DPH because it is classified as a packaged food, while DEP is the lead regulator of water vending machines and bulk drinking water companies. The State Plumbing Board also plays a role in the approval of water vending units in Massachusetts.

Water vending machines must be approved individually by DEP and registered as separate TNCs. Each vending machine must have a state-certified operator who is thoroughly familiar with the system.

The operator's responsibilities include water quality testing, system cleaning, and regular checks of the unit's backflow prevention device to protect both the source water and vended water from contamination at the connection.

Each machine must be tested initially for lead, copper, bacteria, and volatile

organic compounds (VOCs). Thereafter, water vending machines are monitored according to the sampling schedule provided by DEP. Routine monitoring includes monthly tests for bacteria and annual tests for VOCs if the parent public water supply is on an increased monitoring schedule for

VOCs. All samples must be analyzed by a Massachusetts- or EPA-certified laboratory, and results must be reported to DEP.

Bottled water sold in Massachusetts is regulated by DPH in accordance with the federal drinking water standards.

Bottlers must conduct weekly bacteriological and pH tests of the source water, in addition to annual tests for at least 85 chemicals. The results are reported to DPH.

If a bottler's source water originates in Massachusetts, the source must be approved and registered by DEP.

For more information on vending and bottling requirements, please call DEP's Division of Water Supply at (617) 292-5770 or DPH's Division of Food and Drugs at (617) 522-3700.



■ **Source Protection**, *continued from page 5*

that activities in the protective area can be limited to those related to the operation and maintenance of the well.

The well site should be visited and checked routinely for activities that could degrade water quality. Typical threats to water supplies are underground storage tanks, septic systems, stormwater runoff from parking areas and roadways, and the use and storage of hazardous substances, including fuel, motor oil, road salt, herbicides, and pesticides.

As you develop an action plan for protecting your well, seek advice from state and local agencies about identified

threats; post signs around the Zone I to inform neighbors of the environmentally sensitive zone; and educate the community about protecting water supplies.

Free educational resource materials addressing various aspects of water supply protection are available to assist small public water suppliers. For further information, contact DEP's Bureau of Resource Protection at One Winter Street, Boston, MA 02108, (617) 292-5770, or visit our Web site at: <http://www.magnet/state.ma.us/dep/brp/dws/dwshome.htm>. ♦

■ **Health, continued from page 1**

sodium, nitrates, and nitrites.

To assist TNCs with their monitoring, DEP provides sampling schedules and reminder postcards. Certified operators are also vital in helping TNCs to monitor as required.

3. **Certified Operators.** The importance of having a certified operator cannot be sufficiently stressed. When a TNC has a certified operator, not only is



the operator responsible for collecting the samples but he or she will continually survey the facility, provide preventive maintenance, prepare emergency response plans, keep up-to-date on regulatory

changes, and plan for smooth implementation of those changes.

Because many owners of TNCs do not see themselves as public water suppliers, they can benefit greatly from the services of a certified operator who will be responsible for keeping the water system in compliance with the drinking water standards.

4. **Education Partnerships.** DEP has found that education and coordination with local groups and officials are the most effective tools in helping TNCs stay in compliance.

To this end, we have established partnerships with the Massachusetts Department of Public Health (DPH), local boards of health, chambers of commerce, the Independent Testing Laboratories Association, the Massachusetts Board of Building Regulations and Standards, and several non-profit organizations. These groups have helped educate TNC owners, as well as provide support and mentoring.

DEP also works closely with two non-profit organizations: the Rural Community Assistance Program (RCAP) and the Northeast Rural Water Association (NeRWA). These organizations provide free on-site technical assistance and free training for owners of very small water systems.

In The Main

DEP Division of Water Supply
One Winter Street
Boston, MA 02108-4746



Printed on recycled paper

New Initiatives for TNCs

DEP is now incorporating several new initiatives into its TNC program to help ensure that all TNCs in Massachusetts are providing safe drinking water to the public. Among them are:

■ Publication of a comprehensive guide to TNC management. This handbook will be sent to all registered TNCs in November 1996 and to all new systems upon registration.

■ A TNC registration drive, using help from local officials. This effort has been piloted over the last 18 months and has already identified and registered more than 200 "new" systems.

■ Strict enforcement of the certified operator requirements. DEP has started a program to educate all TNCs on their need for a certified operator and has put in place a process for getting all TNCs to comply with the certified operator requirement by July 1, 1997.

■ A continuous surveying program that will require certified operators of TNCs to routinely survey their systems. DEP will perform an on-site survey audit of each TNC on a 5- to 10-year cycle.

■ DEP certificates for all registered TNCs. This program will allow visitors to TNC facilities to clearly identify the systems that are complying with the state Drinking Water Regulations.

■ Publication of a special annual issue of *In the Main* for TNC owners and operators.

Maintaining high-quality drinking water is essential to the health of Massachusetts' residents and visitors. For this reason, DEP has continued to dedicate more resources toward educating TNCs about their responsibilities as public water suppliers.

DEP has set a goal of 95 percent compliance with the Drinking Water Regulations for transient noncommunity systems this year. With the help of TNC owners, certified operators, and all of our local partners, DEP expects to meet and surpass its goal. ♦





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